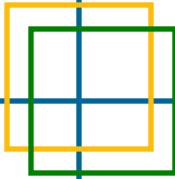




United States  
Environmental Protection  
Agency

Office of Policy,  
Economics and Innovation  
(1807T)

August 2010  
EPA-100-R-10-003



# Evaluation of the EPA Region 1 New England Marina Initiative

Promoting Environmental Results



Through Evaluation

# Acknowledgements

---

This evaluation was conducted by Industrial Economics, Incorporated (IEc) and Eastern Research Group, Inc. (ERG) for EPA's Office of Policy, Economics, and Innovation under Contract EP-W-04-023. An Evaluation Team guided the effort consisting of Larry Wells of EPA's Region 1, Matt Keene of EPA's Office of Policy, Economics, and Innovation; and Lou Nadeau of ERG, Inc. Matt Keene also served as the technical program evaluation advisor. Kimberly Damm of Brown University provided valuable support in editing and reviewing the final report. We would also like to thank the representatives from state government, marina owners and others individuals committed to the health of marina communities who agreed to be interviewed for this evaluation.

This report was developed under the Program Evaluation Competition, co-sponsored by EPA's Office of Policy, Economics and Innovation and the Office of the Chief Financial Officer. To access copies of this or other EPA program evaluations, please go to EPA's Evaluation Support Division's website at <http://www.epa.gov/evaluate>.

---

# TABLE OF CONTENTS

---

<b>TABLE OF CONTENTS</b> .....	<b>II</b>
<b>TABLES AND FIGURES</b> .....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>ACRONYMS</b> .....	<b>3</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>4</b>
<b>CHAPTER 1: INTRODUCTION</b> .....	<b>6</b>
I. Purpose and Objectives of the Evaluation.....	6
II. Overview of the New England Marina Initiative .....	7
III. Evaluation Questions.....	10
<b>CHAPTER 2: METHODOLOGY FOR THE NEW ENGLAND MARINA INITIATIVE EVALUATION</b> .....	<b>12</b>
I. Data Sources.....	12
II. Data Collection.....	12
III. Analytical Approaches .....	15
IV. Confounding Factors .....	16
<b>CHAPTER 3: RESULTS AND FINDINGS</b> .....	<b>20</b>
Question 1: Regulatory Compliance .....	20
Question 2: Best Environmental Practices (BEPs) .....	26
Question 3: Usefulness of the Activities and Materials .....	30
Question 4: The Checklist.....	31
Question 5: Environmental Health of Marina Communities .....	33
Question 6: Improvements to the Initiative.....	34
Question 7: Transferring the Initiative.....	35
<b>CHAPTER 4: DISCUSSION</b> .....	<b>36</b>
<b>CHAPTER 5: RECOMMENDATIONS</b> .....	<b>41</b>
Recommendation 1: Clarify the theory of change .....	41
Recommendation 2: Emphasize near-term, practical outcomes .....	41
Recommendation 3: Prioritize goals and objectives .....	41
Recommendation 4: Specify environmental objectives .....	41
Recommendation 5: Formalize the Initiative.....	42
<b>REFERENCES</b> .....	<b>43</b>
<b>APPENDIX A: INTERVIEW GUIDE FOR STAKEHOLDER INTERVIEW</b> .....	<b>A-1</b>
<b>APPENDIX B: EPA REGION 1, MARINA CHECKLIST FOR DATA COLLECTION DURING SITE VISITS</b> .....	<b>B-1</b>
<b>APPENDIX C: CUSTOMER SATISFACTION SURVEY QUESTIONNAIRE</b> .....	<b>C-1</b>
<b>APPENDIX D: PROPENSITY SCORE MATCHING ANALYSIS</b> .....	<b>D-1</b>
<b>APPENDIX E: PROPENSITY SCORE MATCHING</b> .....	<b>E-1</b>

---

## TABLES AND FIGURES

---

Figure 2-1. EPA Region 1 New England Marina Initiative Logic Model .....	9
Table 3-1. Final Evaluation questions and the components of the logic model to which they correspond .....	11
Table 4-1. Link Between Refined Evaluation Questions, Data Sources, and Analytical Approaches and Tools.....	18
Table 5-1. Propensity Score Matching Analysis Results for Regulatory Outcomes.....	21
Table 5-2. Self-Disclosed Violations and EPCRA Tier II Filings Among Marinas, Before 2001, 2001-2004, and After 2004.....	25
Table 5-3. Propensity Score Matching Analysis Results for Best Environmental Practices Outcomes .	27
Table 5-4. Number of Respondents That Were “Very Satisfied” or “Satisfied” With Initiative Materials’ Ability to Address Different Best Environmental Practices [a] .....	30
Table 5-5. Material Potentially Developed by State Using new England Marinas Initiative Assistance	31
Table 5-6. Percent of Respondents with Less than Three Years of Experience for Selected best Environmental Practices .....	33
Table B-1. Categorization of Checklist Items Between regulatory Compliance and Best Environmental Practices Outcome Categories .....	B-4
Propensity Score Matching Analysis .....	D-1
Figure D-1. 2004 Regulatory Compliance Indicators Assessed Qualitatively (Good, Moderate, and Poor) Grouped By 2001 Qualitative Assessments .....	D-6
Figure D-2. 2004 Best Management Practice Indicators Assessed Qualitatively (Good, Moderate, and Poor) Grouped By 2001 Qualitative Assessment .....	D-7

---

## ACRONYMS

---

BEP	Best Environmental Practice
EMP	Environmental Management Plan
EPA's STORET	STORage and RETrieval
EPCRA	Emergency Planning and Community Right to Know Act
FY	Fiscal Year
ICR	Information Collection Request
LEPCs	Local Emergency Planning Committees
LTM	Long Term Monitoring
MSDS	Material Safety Data Sheet
NGOs	Non-Governmental Organizations
NPDES	National Pollutant Discharge Elimination System
OPEI	Office of Policy Economics and Innovation
OSHA	Occupational Safety and Health Administration
PSM	Propensity Score Matching
PWW	Pressure Wash Wastewater
RCT	Randomized Control Trial
SERCs	State Emergency Response Commissions
SPCC	Spill Prevention, Control and Countermeasure Plan
TIME	Temporarily Integrated Monitoring of Ecosystems
USGS	United States Geological Survey

---

## EXECUTIVE SUMMARY

---

An evaluation of the EPA Region 1 New England Marina Initiative was selected as one of five program evaluations in Fiscal Year (FY) 2008 under EPA's Office of Policy, Economics and Innovation (OPEI) 2007 Program Evaluation Competition. This report presents a description of the New England Marinas Initiative and the questions that the evaluation is designed to answer, the methodology used to answer the evaluation questions, the findings of the study, and useful conclusions and recommendations. The purpose of the evaluation is to assess the effectiveness and transferability of the New England Marinas Initiative.

In 2001, EPA launched the New England Marinas Initiative to address the potentially significant environmental impacts of marinas. The regionally coordinated initiative is designed to improve marina environmental performance by implementing an effective regional education and outreach campaign that improves awareness and compliance, increases the use of best environmental practices (BEPs), and enhances the current assistance provider network to help achieve sustained industry-wide environmental support. The evaluation was conducted between September 2007 and May 2009 based on behavioral data collected between 2001 and 2004 as well as information collected after 2004.

The key findings of this evaluation were developed in response to seven key evaluation questions regarding regulatory compliance improvements, increased use of BEPs, usefulness of program activities and materials, improvements to the program's data collection instruments (i.e. marinas checklist of regulatory compliance and BEPs), increased environmental health of marina communities, improvements to program structure, and interest in applying the program in other EPA Regions and states. To answer the seven evaluation questions, the evaluation team used quantitative (propensity score matching analysis) and qualitative methods to analyze information collected from stakeholder interviews, customer satisfaction surveys and application of the marinas checklist tool to statistically valid samples of New England marinas.

Summary of findings include:

- Statistically significant increases in the percentage of facilities with:
  - Spill prevention procedures in place for transferring oil within the facility
  - MSDs used for training employees that handle hazardous chemicals
  - NPDES storm water permits
  - Spill Prevention, Control and Countermeasure Plan (SPCC) on site
  - Assessment of the methods they're using to prevent oil and fuel releases
  - Structural changes to riprap
  - Structural changes to placement of filters with drains
- Statistically significant decrease in the percentage of facilities with:
  - Spill prevention procedures in place for fuel dispensing
  - Fuels, solvents and paints stored in a protected, secure location, away from drains
  - Fuels, solvents and paints plainly labeled
  - Biodegradable cleaners
- No statistically significant change in the majority of indicators used to measure regulatory compliance and BEPs

- Statistically significant evidence of the regulatory compliance activities and BEPs that marina owners generally do and do not practice
- The marinas checklist is generally perceived as a useful tool to raise awareness among marina operators of regulatory issues and BEPs
- Respondents agree that the checklist is not sufficiently specific for marina owners to understand what it means to be in compliance; a state-specific checklist tool would account for differences in regulations between states and reduce confusion.
- Though states conducted activities and developed materials that contributed to the New England Marinas Initiative, states did not view them as part of the Initiative
- Overall satisfaction amongst the Initiative's participants with its materials and activities
- Stakeholders suggest: specific improvements to the checklist as well as workshops and seminars, more on-site demonstrations of BEPs, and more outreach efforts
- Without more clearly defined objectives, the evaluation team could not identify appropriate data sources for determining the program's impact on the health of marina communities
- Interest in transferring the Initiative to other states and regions is unclear

Given the growing emphasis on the value of networks and collaborative partnerships in achieving measurable environmental goals, the EPA Region 1 New England Marinas Initiative is a valuable model that demonstrates lessons about developing stakeholder networks, improving regulatory compliance and adoption of BEPs, articulating and clarifying program theory, and measuring and evaluating performance. Overall, EPA, states, trade associations and marina owners, and other stakeholders have established a strong foundation for the maintenance and growth of the New England Marinas Initiative.

Recommendations from this evaluation are as follows:

- Clarify the Initiative's theory of change by clearly stating which activities and materials are intended to lead to which desired change amongst marina owners and others.
- Emphasize near-term, practical outcomes by making changes in behavior a top priority and the foundation of the Initiative's learning objectives; hone the effectiveness of education and technical assistance tools and strategies through a combination of ongoing measurement and evaluation
- Given the large number of desired outcomes for the Initiative and limited resources, use the analysis of regulatory compliance and BEPs as well as stakeholder input documented in this report to prioritize goals, objectives and activities
- Refine the Initiative's environmental objectives and related measurement and evaluation work by identifying specific pollutants and/or ecological characteristics most relevant to the health of marina communities in New England
- Actively brand and promote the New England Marinas Initiative to improve communications with Initiative partners as well as states, regions and others that could benefit from implementing a similar initiative or its basic components

Appendices include the following resources: Interview Guide for Stakeholder Interview, Checklist for Data Collection During Site Visits, Customer Satisfaction Survey Questionnaire, Propensity Score Matching Analysis and Method Description of Propensity Score Matching.

---

## CHAPTER 1: INTRODUCTION

---

This program evaluation assesses the effectiveness of the New England Marina Initiative (the Initiative) at building cooperative networks that support improved regulatory compliance and the adoption of best environmental practices (BEPs) among marinas. Started by EPA Region 1, this regionally coordinated initiative builds cooperative networks and partnerships among federal and state environmental agencies, states, regional trade associations, NGOs, and marinas to provide educational and technical assistance to marina owners in the Northeast United States. The evaluation was conducted between September 2007 and May 2009 based on behavioral data collected between 2001 and 2004 as well as information collected after 2004 including: stakeholder interviews, a customer-satisfaction survey and background research on the Initiative and environmental monitoring databases. This report provides a description of the New England Marinas Initiative, the evaluation questions and the methodology used to answer the questions, a summary of results and findings, and conclusions and recommendations for future actions.

### I. PURPOSE AND OBJECTIVES OF THE EVALUATION

The purpose of this evaluation is to assess the effectiveness and transferability of the New England Marinas Initiative.

The evaluation of the New England Marinas Initiative was selected as one of five program evaluations in FY 2008 under EPA's Office of Policy, Economics and Innovation (OPEI) 2007 Program Evaluation Competition. Region 1 received funding and technical assistance from the Evaluation Support Division within OPEI in support of the evaluation. This document provides the results of the evaluation. Specifically, the assessment is intended to help EPA Region 1:

- Determine the effect of the Initiative on the practices of marina owners with respect to regulatory compliance and use of BEPs,
- Better understand what factors influence the practices of marina owners,
- Determine the usefulness of the Initiative's activities and materials,
- Determine the appropriateness of instruments that EPA Region 1 used to measure the performance of the Initiative,
- Understand the influence of the Initiative on the environmental health of marina communities, and
- Identify opportunities to improve and learn from the Initiative and determine States' and Regions' interest in replicating the model.

EPA Region 1 is a primary audience for this evaluation. They will use this evaluation to inform continued improvement of the New England Marinas Initiative as well as document lessons learned thus far. Another primary audience for this evaluation are state and regional programs and organizations similar to the Marinas Initiative with respect to compliance/best practices of marinas, performance measurement, program design, building partnerships/networks, education and outreach, and technical assistance. OPEI will use the results and learning from this evaluation to inform planning, management and evaluations of other environmental programs nationwide.



This report presents: 1) a description of the New England Marinas Initiative and the questions that the evaluation is designed to answer, 2) the methodology used to answer the evaluation questions, 3) the findings of the study, and 4) conclusions and recommendations for the audiences' use.

## **II. OVERVIEW OF THE NEW ENGLAND MARINA INITIATIVE**

In 2001 EPA Region 1 launched the New England Marinas Initiative to address the potentially significant environmental impacts of marinas. The regionally coordinated initiative is designed to improve marina environmental performance by implementing an effective regional education and outreach campaign that improves awareness and compliance, increases the use of best environmental practices (BEPs), and enhances the current assistance provider network to help achieve sustained industry-wide environmental support.

The Initiative focused on several categorical areas where marina owners are responsible for managing potentially significant environmental hazards that arise in the operation of marinas:

- Management of hazardous wastes—Many marina by-products can pose a substantial or potential hazard to human health or the environment when inappropriately managed. Examples of substances that may need to be managed and disposed of according to federal or state hazardous waste requirements could include waste gasoline, solvents, lead-based paint chips, and waste batteries.
- Management of stormwater runoff—Stormwater discharges are generated by runoff from land and impervious areas such as paved streets, parking lots, and building rooftops during rain and snow. They often contain pollutants in quantities that could adversely affect water quality. Most storm water discharges are point source discharges and require coverage by a National Pollutant Discharge Elimination System (NPDES) permit.
- Management of waste oil and fueling facilities—A common stormwater pollutant is petroleum hydrocarbons discharged by improper management of waste oil or spills during boating and tank fueling.
- Other marina related environmental impacts include: boat sewage pumpouts; air emissions from engines; non-hazardous waste generation (e.g., shrink wrap); transfer of non-indigenous aquatic species by boaters; and use of toxic products for activity such as cleaning, painting, and antifreeze protection.

Marinas are often small businesses and many lack the environmental expertise and resources to cope with these potential hazards. In New England there are more than 1,200 marinas governed by federal environmental regulations as well as state regulations that differ across the region.

The New England Marinas Initiative is designed to increase the flow of information and sharing of best environmental practices. It focuses on maintaining and enhancing the current network that provides compliance assistance, pollution prevention materials, outreach and training to marina owners, staff and other partners including state environmental agencies, state and regional trade associations and non-governmental organizations (NGOs). The Initiative aims to educate participants and disseminate knowledge to marina owners about regulations and BEPs with the following activities, products and services:

- Workshops and training
- Technical assistance
- Regulatory interpretations
- Marinas Checklist
- Marina web site
- Fact sheets and other guidance documents
- Marina Environmental Management Plan Workbook
- Inventory of marina owners

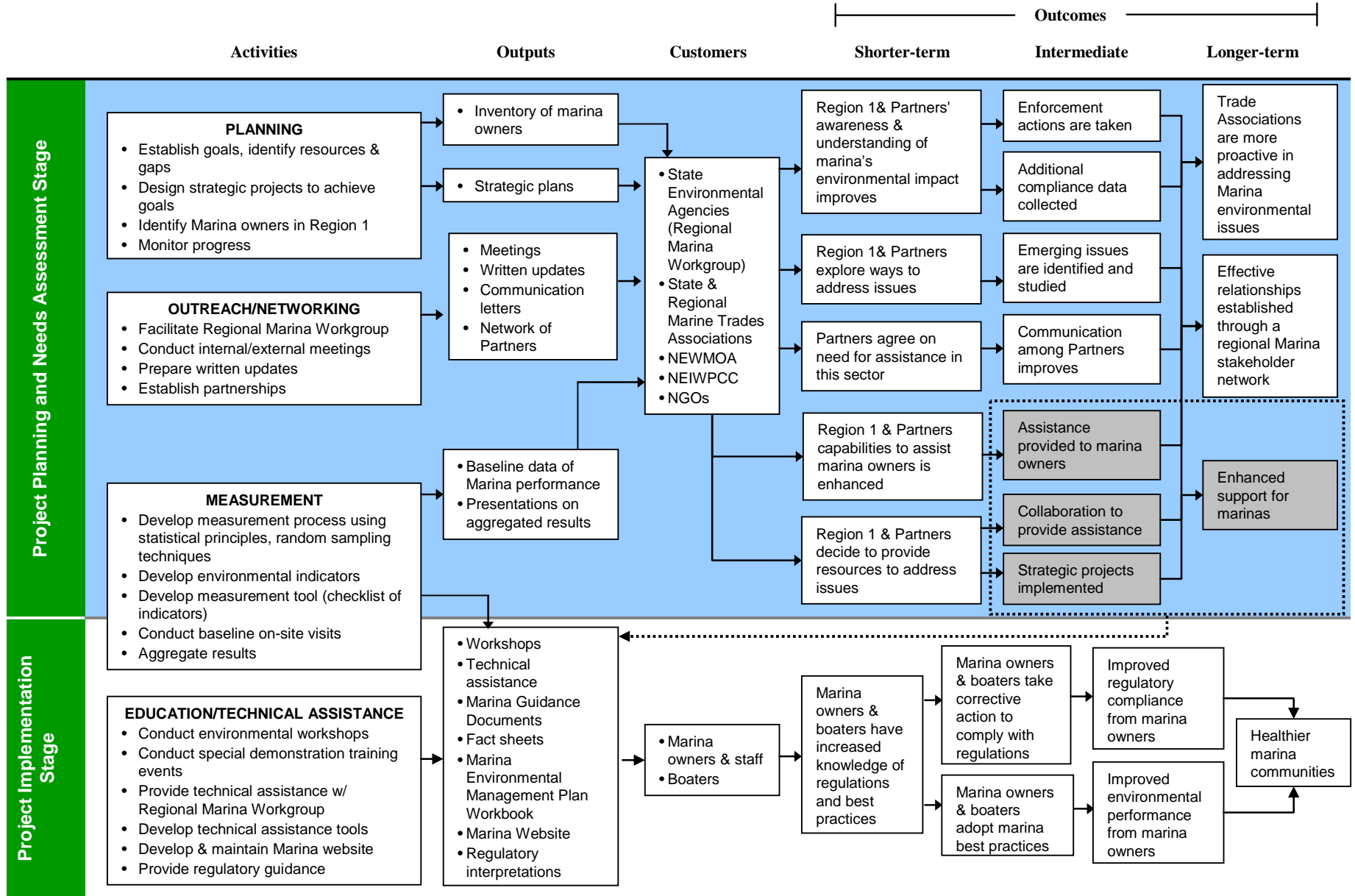
To illustrate the overall design, planning and implementation of the Initiative, EPA Region 1 developed a logic model for the New England Marina Initiative. A logic model depicts a program's theory. It is a picture of the relationships between a program's activities, outputs and outcomes. A logic model documents and explains the elements of the program and their interrelationships, providing an understanding about how the program works – ultimately, it clarifies the underlying assumptions, expectations, and objectives of the program. Logic models are used in evaluations to shape and prioritize the questions of interest for the evaluation.

Two distinct phases are depicted in the Initiative's logic model (Figure 2-1): (1) a project planning and assessment stage; and (2) a project implementation stage. Key components in the Initiative's logic model include:

- *Resources*—the basic inputs of funds, staffing, and knowledge dedicated to the program (not depicted in Figure 2-1).
- *Activities*—specific processes and actions, such as education and technical assistance as well as measurement, which focused primarily on outcomes in the implementation stage.
- *Outputs*—immediate products and services that result from activities often used to measure short-term progress. These actions include workshops, the Marina website, and fact sheets.
- *Customers*—are the users of the activities and outputs, such as the state environmental agencies and state and regional trade associations.
- *Short-Term Outcomes*—intended changes in awareness, attitudes, understanding, knowledge, and skills. For state environmental agencies this means that agencies are aware and agree that marina owners are in need of assistance. For marina owners and staff awareness of regulations and BEPs are short-term outcomes.
- *Intermediate Outcomes*—changes in behavior, such as the collection of additional compliance data, increased efforts to improve communication, and marina owners' adoption of BEPs. Improved regulatory compliance and use of best environmental practices is anticipated.
- *Long-Term Outcomes*—changes in a condition. Improved regulatory compliance in the marina sector, improved environmental performance from marina owners and environmentally healthy marina communities are examples of long-term outcomes.
- *Contextual/External Factors*—potential influences not directly controlled by the Initiative or its entities. For example, local or national economic forces, the industries that marinas serve and that serve marinas or seasonal cycles in the business of marinas.

**Figure 2-1. EPA Region 1 New England Marina Initiative Logic Model**

**Program Goal:** Improve marina environmental performance through implementing an effective regional education and outreach campaign that includes: improving awareness and compliance, increasing implementation of best management practices, and enhancing the current assistance provider network to help achieve sustained industry environmental support.



### III. EVALUATION QUESTIONS

Evaluation questions were developed by the evaluation team and are based on those components of the logic model most critical to program success and most important to Region 1. The question design also considers the data and information available for evaluation. The evaluation is designed to answer seven groups of questions which each address one or more components of the logic model (Table 3-1).

1. To what degree did regulatory compliance at in-scope marinas improve between 2001 and 2004?[c]
  - a. To what extent did the New England Marina Initiative activities and/or materials influence regulatory compliance?
  - b. To what extent did non-program resources (e.g., consultants, non-program guidance documents) influence regulatory compliance?[e]
  - c. To what extent did the state of the marina sector (for example, educationally, economically, and demographically) influence regulatory compliance?
2. To what degree did in-scope marinas increase the use of best environmental practices (BEPs) between 2001 and 2004?[d], [e]
  - a. To what extent did the New England Marina Initiative activities and/or materials influence implementation of BEPs? [f]
  - b. To what extent did non-program resources (e.g., consultants, non-program guidance documents) influence implementation of BEPs? [g]
  - c. To what extent did the state of the marina sector (for example, educationally, economically, and demographically) influence implementation of BEPs?
3. To what degree were the New England Marina Initiative activities and/or materials useful to in-scope marinas in improving regulatory compliance or implementing best environmental practices (BEPs)?
  - a. To what extent were non-program resources (e.g., consultants, non-program guidance documents) useful in improving regulatory compliance or implementing BEPs?
  - b. What materials did states develop, and what are states doing, as part of the New England Marinas Initiative or as part of their own associated activities related to marinas?
4. What items should be added or dropped from the Region 1 Marina Checklist?[h]
  - a. Were any significant items missing from the Region 1 Marina Checklist?
5. To what extent did the New England Marina Initiative lead to healthier marina communities (e.g., improved environmental conditions)?
6. What recommendations for improvement to the program structure can be made?
  - a. Are there specific improvements for transferability to other EPA regions?
7. Among EPA Regions and States is there interest in applying the Region 1 Marina Initiative approach?

**Table 3-1. Final evaluation questions and the components of the logic model to which they correspond**

Evaluation Questions	Key Components of the Logic Model
1. To what degree did regulatory compliance at in-scope marinas improve between 2001 and 2004? <sup>[c]</sup>	<ul style="list-style-type: none"> <li>Improved regulatory compliance from marina owners</li> </ul>
1A. To what extent did the New England Marina Initiative activities and/or materials influence regulatory compliance at in-scope marinas?	<ul style="list-style-type: none"> <li>Improved regulatory compliance from marina owners</li> <li>Enhanced support for marinas</li> </ul>
1B. To what extent did non-program resources influence regulatory compliance at in-scope marinas? <sup>[e]</sup>	<ul style="list-style-type: none"> <li>Improved regulatory compliance from marina owners</li> </ul>
1C. To what extent did the state of the marina sector influence regulatory compliance at in-scope marinas?	<ul style="list-style-type: none"> <li>Improved regulatory compliance from marina owners</li> </ul>
2. To what degree did in-scope marinas increase their use of best environmental practices between 2001 and 2004? <sup>[d], [e]</sup>	<ul style="list-style-type: none"> <li>Increased implementation of best environmental practices from marina owners</li> </ul>
2A. To what extent did the New England Marina Initiative activities and/or materials influence implementation of best environmental practices at in-scope marinas? <sup>[f]</sup>	<ul style="list-style-type: none"> <li>Increased implementation of best environmental practices from marina owners</li> <li>Enhanced support for marinas</li> </ul>
2B. To what extent did non-program resources influence implementation of best environmental practices at in-scope marinas? <sup>[g]</sup>	<ul style="list-style-type: none"> <li>Increased implementation of best environmental practices from marina owners</li> </ul>
2C. To what extent did the state of the marina sector influence implementation of best environmental practices at in-scope marinas?	<ul style="list-style-type: none"> <li>Increased implementation of best environmental practices from marina owners</li> </ul>
3. To what degree were the New England Marina Initiative activities and/or materials useful to in-scope marinas in improving regulatory compliance or implementing best environmental practices?	<ul style="list-style-type: none"> <li>Enhanced support for marinas</li> </ul>
3a. To what extent were non-program resources useful to in-scope marinas in improving regulatory compliance or implementing best environmental practices?	<ul style="list-style-type: none"> <li>Enhanced support for marinas</li> </ul>
3b. What materials did states develop, and what activities are states doing, as part of the New England Marinas Initiative and their own associated activities related to marinas?	<ul style="list-style-type: none"> <li>Enhanced support for marinas</li> </ul>
4. What items should be added or dropped from the Region 1 Marina Checklist? <sup>[h]</sup>	<ul style="list-style-type: none"> <li>Improved regulatory compliance from marina owners</li> <li>Increased implementation of best environmental practices from marina owners</li> </ul>
5. To what extent did the New England Marina Initiative lead to healthier marina communities?	<ul style="list-style-type: none"> <li>Healthier marina communities</li> </ul>
6. What recommendations for improvement to the program structure can be made?	<ul style="list-style-type: none"> <li>Enhanced support for marinas</li> </ul>
6a. Are there specific improvements for transferability to other EPA regions?	<ul style="list-style-type: none"> <li>Enhanced support for marinas</li> </ul>
7. Among EPA Regions and States is there interest in applying the Region 1 Marina Initiative approach?	<ul style="list-style-type: none"> <li>Enhanced support for marinas</li> </ul>

<sup>[b]</sup> Many of these questions require a definition of marinas that are in-scope for this evaluation. Section 3.2 below discusses scope.

<sup>[c]</sup> The regulatory compliance items will be derived from the Checklist that was used in both the baseline and follow-up data collections.

<sup>[d]</sup> The best environmental practice items will be derived from the Checklist that was used in both the baseline and follow-up data collections.

<sup>[e]</sup> The original refined evaluation question was “To what degree did in-scope marinas increase their use of BEPs between 2001 and 2004, between 2001 and 2007, and between 2004 and 2007?” However, due to issues in using the customer satisfaction ICR, statistically valid sampling data were not available for 2007.

<sup>[f]</sup> The original refined evaluation question was “To what extent did the New England Marina Initiative activities and/or materials influence implementation of best environmental practices at in-scope marinas between 2001 and 2007 and between 2004 and 2007?” However, due to issues in using the customer satisfaction ICR, statistically valid sampling data were not available for 2007.

<sup>[g]</sup> The original refined evaluation question was “To what extent did non-program resources (e.g., consultants, non-program guidance documents) influence implementation of best environmental practices at in-scope marinas between 2001 and 2007 and between 2004 and 2007?” However, due to issues in using the customer satisfaction ICR, statistically valid sampling data were not available for 2007.

<sup>[h]</sup> Checklist version dated 7/19/04.

---

## CHAPTER 2: METHODOLOGY FOR THE NEW ENGLAND MARINA INITIATIVE EVALUATION

---

The scope and content of the evaluation methodology is primarily shaped by the program's theory (as represented in the logic model), the evaluation questions, and the data available to answer the questions. Answering each evaluation question requires information and decisions related to data sources, collection methods (e.g. survey, research), collection strategies (e.g. sampling strategy), and the appropriateness of analytical tools and approaches. The systematic consideration and documentation of decisions related to each of these issues results in an evaluation methodology.

This evaluation methodology balances qualitative and quantitative data and analytical methods to answer questions about the Initiative's *outcomes*, for instance regulatory compliance and use of BEPs, and about the Initiative's *process*, such as measurement and educational activities and outputs. The data available enables both *quasi-experimental* and *non-experimental* study designs.

### I. DATA SOURCES

Six data sources were used in this evaluation:

- *Site-visit data*—data collected from marinas during site visits in 2001 (baseline) and 2004 (follow-up). The site visit data represent a key focus of the Initiative itself. Specifically, the Initiative developed a rigorous and statistically valid data collection method and collected information from marinas before and after program implementation.
- *Stakeholder interviews*—interviews of Initiative stakeholders, including EPA, state agencies, and trade associations.
- *Customer satisfaction survey*—a survey of marina owners in the New England region.
- *Additional Data*
  - *Data on self-disclosures of violations and Emergency Planning and Community Right-to-Know Act (EPCRA) Tier II filings*—EPA Region 1 supplied data on both self-disclosures of violations and EPCRA Tier II filings.
  - *Information on installations of boat pressure wash control systems*—representatives from EPA Region 1, industry and trade associations were interviewed regarding the installation of these systems.
  - *Environmental databases and other relevant contextual information*—research for secondary data on water quality and potential non-program influences (e.g., economic state of the marina sector).

### II. DATA COLLECTION

#### SITE VISITS

The New England Marina Initiative included site visits to 70 marinas in 2001 and another 70 in 2004. The purpose of the site visits was to collect statistically valid data on regulatory

compliance and use of best environmental practices at marinas both before and after program implementation. Full compliance was necessary in order for a marina to be considered in compliance. During the visits the Region performed some compliance assistance when requested. During the site visits, EPA staff collected data using the New England Marina Initiative Checklist found in Appendix B. Table B-1 of Appendix B provides a list of the data elements collected through the checklist and whether those questions can be classified as “descriptive,” “regulatory compliance,” or “best practices.”

These data were provided in hardcopy form and used to create a Microsoft Access database form to facilitate conversion to electronic data. The raw data was entered via a double entry procedure to adhere to corporate quality assurance protocols. The data were coded to allow for statistical analysis.

The data provide both baseline and follow-up data on a number of regulatory compliance and best practices that the Initiative was designed to address. The marinas visited in the fall of 2001 differ from those visited in the fall of 2004. Thus, there are no cases where there are before and after observations of the same marina. To make valid and reliable comparisons between the two years’ data, propensity score matching (PSM) methods are incorporated into the evaluation methodology. PSM is discussed in Appendix E.

## **STAKEHOLDER INTERVIEWS**

In-depth interviews with state agencies and trade associations’ staff provide insight on external factors impacting the state of the marina industry, feedback on stakeholders’ opinions about guidance materials and best environmental practices (BEPs), and recommendations to improve the program. The interviews also helped to shape the customer satisfaction survey (next section). The interview format allowed for respondents to provide detailed responses and for interviewers to probe for more thorough responses. A copy of the complete interview guide used in the stakeholder interviews can be found in Appendix A of this report.

Interviews lasted about one hour, and questions focused on:

- Past and present involvement with the Initiative
- Environmental challenges faced by marinas
- Economic obstacles threatening the marina industry
- Other factors affecting marinas
- Interviewee thoughts on the Marina Checklist
- Interviewee thoughts on other program materials and guidance documents
- Initiative influence on state activities
- Recommendations for the Initiative

These interviews were conducted during March and April of 2008 and then again in February 2009. Nine people were interviewed: six state agency staff members (in five interviews), two trade association personnel members, and EPA Region 1’s lead for the initiative.

## CUSTOMER SATISFACTION SURVEY

The evaluation method included a small-scale customer satisfaction survey for this evaluation using EPA's generic Information Collection Request (ICR) (EPA ICR No. 1711.05, OMB Control No. 2090-0019) from Office of Management and Budget. The purpose of the survey was to collect information on:

- Awareness among in-scope marinas of the compliance assistance materials developed by the Initiative,
- Use of the compliance assistance materials among in-scope marinas,
- Satisfaction among in-scope marinas with the compliance assistance materials,
- Suggestions for improvements to the compliance assistance materials from the in-scope marinas, and
- Experience with a set of specific best environmental practices.

The survey was implemented as a mail survey and recipients were randomly selected. Prior to selection, the list of marinas (provided by EPA Region 1) was sorted by state to ensure proportional representation among the New England states. Each survey recipient was sent a reminder letter approximately a week to 10 days following the initial mailing. A copy of the survey can be found in Appendix C.

The survey was sent to 224 marinas (including replacements for out of scope entities) with the intent of collecting a total of 86 valid responses. Twenty-two responses were received. There were multiple reasons for the poor response:

- *Timing*—due to delays in the review process, the survey was sent to marinas during one of the busiest times for marinas (late Spring/early summer). Thus, many marinas, which are primarily small operations, had little time to respond to the survey.
- *Marinas inventory*—Region 1's inventory of New England Marinas, including physical addresses, was used to develop the sampling frame. Twelve percent (27) of surveys were returned to sender (not delivered).
- *Survey letter*—the survey letter sent to marina owners listed an incorrect phone number for the survey help desk. This may have affected the response rate; however, the letter included an email address and only one question concerning the survey was received via email. The correct contact phone number and e-mail address for the survey help desk were provided on the reminder letter. One marina operator inquired about the survey by phone.

## ADDITIONAL DATA AND INFORMATION

- *Self-disclosed violations data*—a list of self-disclosed violations by marinas in the northeast was provided (but not audited for completeness) by Region 1. It is administrative data maintained by EPA Region 1 that may serve as an indicator regarding the effect of the Initiative on self-disclosures and indicate the potential effect that the Initiative has had on improving compliance and safeguarding public health.



- *EPCRA Tier II filings among marinas*—this is a listing of EPCRA Tier II filings among marinas. Facilities that are covered by EPCRA are required to file Emergency and Hazardous Chemical Inventory Forms with their Local Emergency Planning Committees (LEPCs), State Emergency Response Commissions (SERCs), and local fire departments each year. Marinas are required to submit a “Tier II” form. These data may serve as an indicator of the effect of the Initiative on Tier II filings and indicate the potential effect that the Initiative has had on improving compliance and safeguarding public health.
- *Information on Increased Use of Boat Pressure Wash Equipment Control Technologies*—boat pressure wash wastewater (PWW) treatment is a focus of the Initiative. When boats are pressure washed, harmful residues, paints, and other materials may contaminate surrounding land and water. Wastewater from processes like these is regulated under the Clean Water Act, and marinas are required to have discharge permits or to capture and dispose of the wastewater responsibly. EPA Region 1 supplied reference to information on the increased installation of boat pressure wash equipment control technologies. The evaluation team obtained information from Region 1, the Trade Associations, and several suppliers of PWW treatment technologies for marinas to examine the relationship between the Initiative and the number of system installations.
- *Secondary Data Sources on Water Quality and External Factors*—the evaluation identified three potential data sources for assessing the effect of the Initiative on water quality: 1) U.S. Geological Society (USGS) Water Data for the Nation<sup>1</sup>, 2) EPA National Water Quality Inventory Report to Congress (305(b) reports)<sup>2</sup>, and 3) EPA’s STORET (short for STORage and RETrieval) data<sup>3</sup>.
- *External/Contextual Factors*—The evaluation did not identify external data sources but did discuss the impact of external factors on the Initiative’s outcomes with stakeholders during the interviews.

### III. ANALYTICAL APPROACHES

Keeping an eye on the relationships between evaluation questions, data sources and analytical methods is important to maintaining the focus of an evaluation – Table 4.1 provides a quick reference to those relationships. The importance of the questions and the quality of the data guide decisions about study design within an evaluation. This evaluation has access to a range of data types that encourage the use of a variety of analytical tools.

First, the site visit data is based on a statistically valid sample surveyed by Region 1 and enables the use of a *quasi-experimental evaluation design* to quantitatively answer some evaluation questions related to the state of and changes in regulatory compliance and the use of BEPs in the marinas sector. Specifically, this evaluation used the Propensity Score Matching (PSM) method which compares outcomes between treatment and control groups in cases where a randomized control trial (RCT) has not been used. See Appendix F for a detailed discussion on the use of the PSM method in the evaluation. An alternative approach would have been standard statistical hypothesis testing on the differences between two mean values. PSM is a more rigorous

---

<sup>1</sup> <http://waterdata.usgs.gov/nwis>

<sup>2</sup> <http://www.epa.gov/305b/>

<sup>3</sup> <http://www.epa.gov/storet/index.html>

approach to looking for program impacts since it involves comparing matched units over time, thus mimicking an RCT.

Second, due to limitations on the sample size of potential respondents and the lack of potential control groups (no stakeholder interviews were conducted prior to Initiative implementation), *non-experimental* direct analysis was used to analyze data gathered through stakeholder interviews and interviews on pressure wash control systems. Tools used to analyze qualitative data included content analysis and recursive abstraction. Generally, content analysis is an approach to systematically and objectively make inferences, using quantitative or qualitative techniques, by identifying specific characteristics of messages (e.g. the information recorded during interviews). Recursive abstraction is the repeated distillation of data and information to create compact summaries of qualitative information that emphasizes the key messages of datasets. The stakeholder interview questions primarily collect qualitative information. From interview notes, responses were summarized, condensed and categorized by common themes, evaluation question, and stakeholder group. The framework for organizing information consisted of a series of summary documents to catalog themes and corresponding passages. This format enabled comparisons between interview responses within and across stakeholder groups. Preliminary findings and recommendations were reviewed by the evaluation team.

Third, the customer satisfaction survey was sent to a statistically valid sample of the population; however, the low response rate confounds the opportunity to make statistical inferences related to the satisfaction of marina owners with the Initiative. The information gleaned from the survey was coded and organized for data tabulation. Due to gaps in data and data credibility concerns, the available Tier II and self disclosure violations data was also not suited for inferential statistics and was similarly tabulated.

#### **IV. CONFOUNDING FACTORS**

The evaluation's results and recommendations are influenced by variety of factors that confounded or limited data access and collection as well as analysis. First, the evaluation team stated a clear interest in analyzing the relative effectiveness of the program's various education and assistance tools (e.g. website, workbook, workshops). Given the resources allocated to this evaluation and the time necessary to acquire an Information Collection Request to support a use of a survey instrument that investigates behavior change, evidence of the relative effectiveness of education and outreach tools is based on interviews of key informants and is useful in prioritizing future planning efforts. Self disclosed and Tier II data was provided late in the evaluation or after the evaluation was complete. The data is tabulated and the descriptive statistics can be used to indicate program contribution and guide future planning and action. Because the customer satisfaction survey suffered from a low response rate, the data it generated could not be analyzed to provide statistically valid information on satisfaction. Results from the Propensity Score Matching (PSM) analysis should be considered in light of its limitations. First, State programs that may have affected the effectiveness of the Initiative are not accounted for in the analysis. Second, the results of the PSM analysis are too narrow to be used in isolation and the evaluation employs multiple methods to attempt to take account for context and non-observed and unobservable variables that the PSM method does account for – PSM can not match unmeasured variables. The value of the qualitative analysis of stakeholder interviews is

limited by the relatively small number of interviews and findings may not be representative of all program participants. In conserving resources for the evaluation, the evaluation method was deliberate in selecting key individuals to interview based on their specific knowledge and experience with the Marinas Initiative. We cannot assume that their experiences and perspectives are necessarily representative of all involved, and the individuals selected to participate in an interview may have vastly different experiences and views than those who were not selected.

**Table 4-1. Link Between Refined Evaluation Questions, Data Sources, and Analytical Approaches and Tools.**

Refined Evaluation Question Based on Revised Logic Model	Data Sources	Analytical Approaches
1. To what degree did regulatory compliance at in-scope marinas improve between 2001 and 2004?	See below	See below
1A. To what extent did the New England Marina Initiative activities and/or materials influence regulatory compliance at in-scope marinas following implementation?	<ul style="list-style-type: none"> <li>• Site visit data</li> <li>• Stakeholder interviews</li> <li>• Self-Disclosure data</li> </ul>	<ol style="list-style-type: none"> <li>1. Statistical comparisons, using Propensity Score Matching, of the 2001 and 2004 values for compliance-related items on the site visit data.</li> <li>2. Content analysis of site visit data and PSM results.</li> <li>3. Tabulation of self-disclosure and TIER II data to determine the extent to which these submissions increased among marinas following implementation of the program.</li> <li>4. Qualitative analysis of information from stakeholder interviews and key informants on the installation boat pressure washing control systems at marinas.</li> </ol>
1B. To what extent did non-program resources (e.g., consultants, non-program guidance documents) influence regulatory compliance at in-scope marinas following implementation of the Initiative?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> <li>• Information on the installation of boat pressure wash control technologies</li> </ul>	<ol style="list-style-type: none"> <li>5. Qualitative analysis of information from stakeholder interviews.</li> <li>6. Tabulation and analysis of data from the customer satisfaction survey and from the information on the installation of boat pressure wash control technologies.</li> </ol>
1C. To what extent did the state of the marina sector (for example, educationally, economically, and demographically) influence regulatory compliance at in-scope marinas following implementation of the Initiative?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> <li>• Information on the economic state of the marina sector</li> </ul>	<ol style="list-style-type: none"> <li>7. Qualitative analyses of information obtained through the stakeholder interviews and information on the economic state of the marina sector.</li> </ol>
2. To what degree did in-scope marinas increase their use of best environmental practices between 2001 and 2004?	See below	See below
2A. To what extent did the New England Marina Initiative activities and/or materials influence implementation of best environmental practices at in-scope marinas?	<ul style="list-style-type: none"> <li>• Site visit data</li> <li>• Stakeholder interviews</li> <li>• Customer satisfaction survey</li> </ul>	<ol style="list-style-type: none"> <li>8. Statistical comparisons, using Propensity Score Matching, of the 2001 and 2004 values for best practices-related items on the site visit data.</li> <li>9. Content analysis of site visit data and PSM results.</li> <li>10. Qualitative analysis of information from stakeholder interviews and customer satisfaction survey.</li> </ol>
2B. To what extent did non-program resources (e.g., consultants, non-program guidance documents) influence implementation of best environmental practices at in-scope marinas?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> </ul>	<ol style="list-style-type: none"> <li>11. Qualitative analysis of information from stakeholder interviews.</li> </ol>
2C. To what extent did the state of the marina sector (for example, educationally, economically, and demographically) influence implementation of best environmental practices at in-scope marinas following implementation of the Initiative?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> <li>• Information on the economic state of the marina sector</li> </ul>	<ol style="list-style-type: none"> <li>12. Qualitative analysis of information from stakeholder interviews and information on the economic state of the marina.</li> </ol>
3. To what degree were the New England Marina Initiative activities and/or materials useful to in-scope marinas in improving regulatory compliance or implementing best environmental practices?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> <li>• Customer satisfaction survey</li> </ul>	<ol style="list-style-type: none"> <li>13. Qualitative analysis of information from stakeholder interviews and customer satisfaction survey.</li> </ol>

Refined Evaluation Question Based on Revised Logic Model	Data Sources	Analytical Approaches
3A. To what extent were non-program resources (e.g., consultants, non-program guidance documents) useful to in-scope marinas in improving regulatory compliance or implementing best environmental practices?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> </ul>	14. Qualitative analysis of information from stakeholder interviews.
3B. What materials did states develop, and what are states doing, as part of the New England Marinas Initiative and their own associated activities related to marinas?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> </ul>	15. Qualitative analysis of information from stakeholder interviews.
4. What items should be added or dropped from the Region 1 Marina Checklist?	<ul style="list-style-type: none"> <li>• Site visit data</li> <li>• Customer satisfaction survey</li> <li>• Stakeholder interviews</li> </ul>	16. Qualitative analysis of information from stakeholder interviews, customer satisfaction survey, and results of PSM analysis. 17. Tabulate and assess data from the checklist.
5. To what extent did the New England Marina Initiative lead to healthier marina communities (e.g., improved environmental conditions)?	<ul style="list-style-type: none"> <li>• Stakeholder interviews (to determine the availability of data)</li> <li>• Site visit data</li> </ul>	18. Qualitative analysis of site visit data and information from stakeholder interviews.
6. What recommendations for improvement to the program structure can be made?	<ul style="list-style-type: none"> <li>• Customer satisfaction survey</li> <li>• Stakeholder interviews</li> </ul>	19. Qualitative analysis of information from stakeholder interviews the customer satisfaction survey. 20. Tabulation and content analysis of site visit data.
6A. Are there specific improvements for transferability to other EPA regions?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> </ul>	21. Qualitative analysis of information from stakeholder interviews.
7. Among EPA Regions and States is there interest in applying the Region 1 Marina Initiative approach?	<ul style="list-style-type: none"> <li>• Stakeholder interviews</li> </ul>	22. Qualitative analysis of information from stakeholder interviews.

---

## CHAPTER 3: RESULTS AND FINDINGS

---

This section presents the results and findings of the evaluation of the New England Marina Initiative. The section is organized by the seven key evaluation questions and findings are summarized below.

### QUESTION 1: REGULATORY COMPLIANCE

#### TO WHAT DEGREE DID REGULATORY COMPLIANCE AT IN-SCOPE MARINAS IMPROVE BETWEEN 2001 AND 2004?

##### PROPENSITY SCORE MATCHING ANALYSIS OF CHECKLIST DATA

A propensity score matching analysis (see Appendix E for details) was conducted to determine changes in regulatory compliance amongst marinas between 2001 and 2004. Table B-1 in Appendix B presents a list of the data items from the marinas Checklist that were categorized as either “regulatory compliance” or “best environmental practices” (BEPs). Most of the items on the Checklist are simple yes/no questions and thus a percentage of marinas who reported a specific outcome for 2001 and one for 2004 can be calculated and compared. Table 5-1 presents the results of the analysis of regulatory compliance, including *statistical* significance of the results. All of the indicators presented in Table 5-1 are regulatory requirements.

Requirements were categorized as follows: Hazardous Waste 10, Oil and Fuel 12 (storage 9, SPCC 3) Hazardous Materials 3, Storm Water 9 (NPDES: permit 1, pressure washing 2, BEPs 6). After the baseline measure, the Region decided not to focus on oil and fuel storage due to resource issues. Some requirements have thresholds. Facilities that fall under the thresholds are not required to meet the requirement. Any facility that did not meet a threshold for a regulatory requirement was not included in the analysis for the requirement.<sup>4</sup>

For facilities that reported an outcome in both 2001 and in 2004, the analysis identified six compliance outcomes that changed significantly (Table 5-1 boldface boxes). The analysis indicated a statistically significant:

- **Increase** in the percentage of facilities with:
  - ***Spill prevention procedures in place for transferring oil within the facility*** (48.2 percent in 2001; 74.5 percent in 2004).
  - ***MSDs used in training employees that handle hazardous chemicals*** (52.2 percent in 2001; 73.5 percent in 2004).
  - ***NPDES Storm Water Permits***, among facilities requiring an NPDES Storm Water Permit (2.4 percent in 2001; 35.4 percent in 2004).
- **Decrease** in the percentage of facilities with:
  - ***Spill prevention procedures in place for fuel dispensing*** (96 percent in 2001; 83.7 percent in 2004).

---

<sup>4</sup> Facilities falling under a regulatory threshold were included in the analysis for best environmental practices in Section 5.2.1 below.

- *Fuels, solvents and paints are stored in a protected, secure location, away from drains* (95 percent in 2001; 80 percent in 2004).
- *Fuels, solvents and paints plainly labeled* (91.7 percent in 2001; 56.9 percent in 2004).

Three compliance outcomes showed statistically significant declines. In each case the 2001 percentage was above 90 percent. In testing statistically significant differences between percentages, it is more common to find statistically significant differences when one value is close to either zero (0%) or one (100%).

The analysis identified five statistically insignificant increases in outcomes (positive change) where the increase was greater than 10 percentage points between 2001 and 2004. The analysis also identified three statistically insignificant decreases in outcomes (negative change) where the decrease was greater than 10 percentage points between 2001 and 2004.

Questions have been grouped to communicate the degree to which regulatory compliance changed between 2001 and 2004 (Table 5-1). Green indicates that greater than 90 percent of facilities achieved the regulatory outcome, yellow indicates between 50 and 90 percent and red indicates that less than 50 percent of facilities reported compliance with the desired outcome. In 2001 eight outcomes were above 90% compliance (green). In 2004 four of those remained above 90% and four dropped below 90%. There were two improvements from less than 50% compliance to above 50% between 2001 and 2004.

PSM analysis does not calculate the statistical significance of differences when one value is either zero or one. This occurred for three outcomes in the table. For two outcomes (secondary containment and leak detection for below ground oil storage), compliance was 100 percent in both 2001 and then in 2004, albeit among only two facilities in 2001 and three in 2004. For the third outcome where PSM could not calculate a difference (SPCC plan posted in plain view at oil storage locations), compliance was zero in 2001 (among 10 facilities) and was 7.7 percent in 2004 (among 13 facilities).

**Table 5-1. Propensity Score Matching Analysis Results for Regulatory Outcomes.**

Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis	
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Estimated Difference between 2004 and 2001 Facilities [a]	Statistically Significant? [b]
<b>Hazardous Waste</b>						
<i>Are Manifests Documenting Hazardous Waste Shipments Kept, Going Back At Least 3 Years?</i>	55	76.40%	56	75.00%	-0.047	No
<i>Do employees receive training in proper handling of wastes?</i>	63	81.00%	65	73.80%	-0.154	No
<i>Do employees receive training in emergency procedures?</i>	63	81.00%	60	81.70%	-0.064	No
<i>Are Quantities Of Hazardous Waste Generated By The Marina Calculated Each Month, To Determine What Size Generator The Marina Is?</i>	63	15.90%	61	14.80%	-0.031	No

Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis	
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Estimated Difference between 2004 and 2001 Facilities [a]	Statistically Significant? [b]
<i>Are All Hazardous Wastes Stored In Labeled Containers?</i>	59	57.60%	59	59.30%	0.061	No
<i>Are All Hazardous Wastes Stored In A Dedicated Storage Area?</i>	60	81.70%	58	86.20%	0.081	No
<i>Are All Hazardous Wastes Stored Indoors Or Covered?</i>	60	71.70%	58	82.80%	0.126	No
<i>Are All Hazardous Wastes Stored In An Area With An Impervious Floor?</i>	60	66.70%	57	75.40%	0.118	No
<i>Are All Hazardous Wastes Stored With Storage Area Spill Containment?</i>	60	45.00%	55	58.20%	0.16	No
<i>Are All Hazardous Wastes Shipped With A Properly Licensed Transporter?</i>	49	83.70%	57	86.00%	-0.023	No
<b>Oil and Fuel</b>						
<i>Is A Spill Prevention, Control And Countermeasure Plan (SPCC) On Site? [c]</i>	10	20.00%	14	35.70%	0.192	No
<i>Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Signed By A Registered Professional Engineer? [c]</i>	9	11.10%	13	15.40%	0.083	No
<i>Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Posted In Plain View At Oil Storage Locations? [c]</i>	10	0.00%	13	7.70%	-	-
<i>Does Above Ground Oil Storage (Including Piping System) Have Secondary Containment? [c]</i>	10	90.00%	15	86.70%	-0.111	No
<i>Does Above Ground Oil Storage (Including Piping System) Have Leak Detection? [c]</i>	9	55.60%	13	61.50%	-0.038	No
<i>Does Below Ground Oil Storage (Including Piping System) Have Secondary Containment? [c]</i>	2	100.00%	3	100.00%	0	-
<i>Does Below Ground Oil Storage (Including Piping System) Have Leak Detection? [c]</i>	2	100.00%	3	100.00%	0	-
<i>Are Spill Prevention Procedures In Place For Receiving Oil From A Supplier? [c]</i>	41	75.93%	27	64.29%	-0.057	No
<i>Are Spill Prevention Procedures In Place For Transferring Oil Within The Facility? [c]</i>	27	48.21%	35	74.47%	0.251	Yes
<i>Are Spill Prevention Procedures In Place For Waste Oil Disposal? [c]</i>	37	67.27%	40	75.47%	0.049	No
<i>Does The Facility Have Spill Prevention Procedures In Place For Fuel Dispensing?</i>	50	96.00%	43	83.70%	-0.151	Yes
<i>Is Containment In Place In Case Of A Spill?</i>	52	86.50%	47	83.00%	-0.064	No
<b>Hazardous Materials</b>						
<i>Has The Amount Of Each Hazardous Material Stored Onsite Been Calculated (Including Motor Fuel In Above-Ground Systems Greater Than 10,000 Lbs Capacity) To Determine If Reporting To The Local Emergency Planning Committee Is Necessary?</i>	63	23.80%	51	25.50%	-0.015	No
<i>Are Material Safety Data Sheets (MSDSs) For All Hazardous Chemicals Kept On File?</i>	63	63.50%	66	78.80%	0.106	No



Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis	
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Estimated Difference between 2004 and 2001 Facilities [a]	Statistically Significant? [b]
Are Material Safety Data Sheets (MSDSs) Used For Training All Employees Handling Hazardous Chemicals?	67	52.20%	49	73.50%	0.197	Yes
<b>Stormwater</b>						
<i>Does The Marina Have A NPDES Storm Water Permit? [d]</i>	41	2.40%	48	35.40%	0.354	Yes
When Pressure Washing Boats Coated With Ablative Paints, Is Removed Material Collected To Prevent Releases To Water?	61	59.02%	63	63.49%	-0.019	No
When Pressure Washing Boats Coated With Ablative Paints, Is Removed Material Collected To Prevent Contamination Of Land?	61	55.74%	62	53.23%	-0.072	No
Are Blasting, Other Paint Preparation And Painting Activities Contained Or Controlled To Prevent Abrasives, Paint Chips, And Overspray From Being Released To The Water?	51	82.35%	55	81.82%	-0.023	No
Are Blasting, Other Paint Preparation And Painting Activities Contained Or Controlled To Prevent Abrasives, Paint Chips, And Overspray From Being Released To Land?	51	82.35%	57	73.68%	-0.114	No
Are Blasting, Other Paint Preparation And Painting Activities Contained Or Controlled To Prevent Abrasives, Paint Chips, And Overspray From Being Released To Protect Employees?	52	90.40%	51	92.20%	0	No
Are All Engine Fluids Promptly Transferred From Parts, Drip Pans, Used Filters And Other Containers To Closed Receptacles For Disposal Or Recycling?	57	96.50%	61	90.20%	-0.065	No
Are Fuels, Solvents And Paints Stored In A Protected, Secure Location, Away From Drains?	60	95.00%	65	80.00%	-0.125	Yes
Are Fuels, Solvents And Paints Plainly Labeled?	60	91.70%	58	56.90%	-0.368	Yes

Key: Green = Indicator value above 90 percent; yellow = indicator value between 50 and 90 percent; and red = indicator value below 50 percent.

[a] The estimated difference reflects the percentage point difference between the treatment group and control group included in the analysis. Due to the nature of PSM methods, this will not be the same as the difference between the 2001 average and the 2004 average.

[b] This column indicates whether the PSM analysis found the difference between the 2001 and 2004 marinas to be statistically significant using the 90 percent level of confidence (10 percent significance level).

[c] This outcome is a regulatory requirement if an above ground storage tanks holds 1,320 gallons or greater and/or a below ground storage tank has a capacity of 42,000 gallons or more; therefore the PSM analysis for this outcome includes only facilities where site visit data indicates that either of these criteria is met (i.e. if the answer to either of the last two parts of question 4A of the Checklist is "Yes"). See Appendix B for the complete questions.

[d] This outcome is a regulatory requirement if a NPDES permit is required; therefore the PSM analysis for this outcome includes only facilities where site visit data indicates that this criterion is met (i.e. if the answer to question 9A of the Checklist is "Yes"). See Appendix B for the complete question.

## STAKEHOLDER INTERVIEWS

Analysis of stakeholder interviews provides insights into the impact of the Initiative on regulatory compliance. Marina owners indicated they have a business interest in maintaining high water quality (e.g. high water quality leads to increased customer satisfaction among marina users) but often lack the knowledge about their individual responsibility and how it relates to maintaining the water quality. Interviewees felt that the Initiative's cooperative approach that allowed for the sharing of information among stakeholders has increased marinas' knowledge about their compliance requirements and made a difference in regulatory compliance at marinas. One interviewee pointed out that although marinas are made aware of regulatory compliance issues through the Initiative and are taking steps to achieve compliance, many marinas are still violating regulations simply because of recordkeeping issues.

Interviewees suggested that the state of the marina sector (for example, education, economics, and demographics) had an influence on regulatory compliance following implementation of the Initiative. Almost all interviewees said that the biggest external influence on regulatory compliance was the marinas' ability to meet the costs of compliance. The EPA Region 1 lead for the Initiative indicated that the cost of pressure wash wastewater control systems is a significant economic obstacle as these systems can cost up to \$200,000. Interviewees think that marinas are adopting BEPs but that most do not have the financial resources to make bigger facility changes or significant cash outlays.

In addition, interviewees felt that marinas face the same issues as other small businesses. For instance, rapidly changing practices and regulations drastically increase costs and make it prohibitively expensive for marinas to come into compliance in the short term. Interviewees also said their organizational structure added difficulties to dealing with the environmental issues that marinas face (e.g. high employee turnover rates and complex regulatory guidance). However, regulations and areas of profitability (i.e. maintenance and repair, not storage), were also cited as responsible for limiting the number and frequency of do-it-yourself activities for boaters. With more of the environmentally-sensitive activities carried out by employees as opposed to boaters, marinas are able to better monitor their actions and compliance.

Since the start of the Initiative, Region 1 became particularly interested in increasing the number of marinas with MSDSs and NPDESs, which are important in at least two compliance areas: (1) making hazardous waste determinations and (2) identifying hazardous material under the Emergency Planning and Community Right to Know Act. NPDES storm water permits are important for marinas since almost all marinas will be affected by storm water issues. To achieve these and other priority regulatory outcomes identified by stakeholders, the EPA Region 1 lead suggested that local governments can influence marinas by setting requirements and encouraging the use of best practices. Local agencies have considerable influence and a clear incentive to provide additional sources of information to assist marinas in achieving compliance. They often have regulatory requirements that are more stringent than or differ from EPA's.

Increased uses of MSDSs and NPDES storm water permits were among the three regulatory compliance outcomes that were estimated to have a significant increase between 2001 and 2004. Region 1 considers both of these to be significant improvements for a number of reasons. MSDSs are important compliance areas because they aid in making hazardous waste

determinations and in identifying hazardous material under the Emergency Planning and Community Right to Know Act. Compliance with the Storm Water General Permit is a fundamental environmental performance factor as storm water is an issue for most marinas.

SPCC plans were of particular interest to Region 1 because marinas may store large quantities of oil and fuel in the immediate proximity of critical natural resources or densely populated areas. Among facilities required to have a SPCC, the percentage in compliance increased from 20 percent to 36 percent, a 16 percentage point increase in compliance. However, the increased compliance rate was not statistically significant in the PSM analysis (there were too few facilities in each year to allow for finding a significant difference) and rate in 2004 was still below 50 percent compliance. Nevertheless, it should also be noted that seven facilities in the data had SPCC in place even though it appears they were not required of those facilities.

#### ADDITIONAL DATA AND INFORMATION

- *Self-Disclosures and EPCRA Tier II Filings Data*

EPA Region 1 provided data on the number of self-disclosures and the number of EPCRA Tier II filings dating back to the 1990s.<sup>5</sup> The tabulations of these data for different time periods are shown in Table 5-2. Since the New England Marinas program ran from 2001 to 2004, we included three periods in the tabulation: before 2001, 2001-2004, and after 2004.

**Table 5-2. Self-Disclosed Violations and EPCRA Tier II Filings Among Marinas, Before 2001, 2001-2004, and After 2004.**

Type of Filing	Date Of Filing		
	Before 2001	2001-2004	After 2004
Marinas Self Disclosures	0	16	2
All Self Disclosures	24	240	127
Marinas as Percent of All Self Disclosures	0.0%	6.7%	1.6%
Marina EPCRA Tier II Filings	2	89	237

For the self-disclosures of violations<sup>6</sup> prior to 2001, there were no self-disclosures reported among marinas. Between 2001 and 2004, 16 self-disclosures were reported. The 16 reported disclosures represented 6.7 percent of all reported disclosures. Following 2004 there were two self-disclosures at marinas. Prior to 2001 two marinas completed EPCRA Tier II filings. Between 2001 and 2004, 89 facilities filed, and between 2004-2007, filings increased to 237.

<sup>5</sup> For the self-disclosure data, the earliest date in the data provided was June of 1999 and the most recent date was in 2006. For the Tier II filings, the earliest date in the data was for 1995 and the most recent was in 2007.

<sup>6</sup> Each self-disclosure could involve one or more violations.

## **INFORMATION ON THE INSTALLATION OF BOAT PRESSURE WASHING CONTROL SYSTEMS AT MARINAS**

EPA Region 1 observed three pressure wash wastewater (PWW) treatment installations during compliance assistance visits after 2004. These systems were not observed at marinas during 2001 or 2004 site visits. A representative of the MA Marine Trades Association indicated that in early 2008 the Trade Association coordinated the bulk purchase of PWW systems for a number of marinas in the association. The representative indicated that the marinas with which he is familiar had a PWW control system installed or on order by 2008.

Four PWW treatment suppliers were contacted about the demand for their products pre- and post-2004.

- Company A installed 30 systems as of February 2009. The company has seen a noticeable increase in demand for its products among New England marinas since 2004; however, the company did not initiate sales of pressure wash products to marinas until late 2004 or early 2005. Company A speculates that there was no demand for these products before 2004 because the issue had not been widely understood as a priority by marinas, the public, or the regulatory community. Since 2004 demand increased and triggered Company A to develop their technology for the marina industry.
- Company B has seen no increase in sales or inquiries about products from marinas in New England for PWW recycle systems since 2004.
- Company C reported completing four installations since 2004.
- Company D reported recently installing two systems in Connecticut.

### **QUESTION 2: BEST ENVIRONMENTAL PRACTICES (BEPs)**

**TO WHAT DEGREE DID IN-SCOPE MARINAS INCREASE THEIR USE OF BEPs BETWEEN 2001 AND 2004?**

#### **PROPENSITY SCORE MATCHING ANALYSIS OF CHECKLIST DATA**

A propensity score matching analysis was conducted in parallel with the analysis of compliance outcomes discussed in the previous section to determine to what degree in-scope marinas increased their use of BEPs between 2001 and 2004. Table 5-3 presents the results of the analysis for BEP outcomes, including the *statistical* significance of the results. Two types of indicators are presented in Table 5-3 to reflect best environmental practices: (1) Indicators that are not regulatory requirements, and (2) Indicators that are regulatory requirements, but that have a threshold. In this case facilities that fall under the threshold are not required to meet the requirement. Thus, the indicator then represents a BEP for facilities that fall under the regulatory threshold.

Five BEP outcomes had a statistically significant difference (Table 5-3 boldface boxes) between facilities that reported an outcome in 2001 compared with facilities that reported an outcome in 2004. The analysis indicated a statistically significant:

- **Increase** in the percentage of facilities:
  - **With a Spill Prevention, Control and Countermeasure Plan (SPCC) on site** among facilities where it is not required. (from 2.8 percent in 2001 to 24.1 percent in 2004).
  - **With an assessment of the effectiveness of the methods they're using to prevent oil and fuel releases.** (from an average value of 2.87 in 2001 to an average value of 3.18 in 2004, both based on a four-point scale where 4 was "Excellent" and 1 was "Poor").
  - **That made structural changes to riprap** (21.9 percent in 2001; 44.8 percent in 2004).
  - **That made structural changes to placement of filters and drains** (14.1 percent in 2001; 42 percent in 2004).
  
- **Decrease** in the percentage of facilities that:
  - **Switched to biodegradable cleaners** (88.7 percent in 2001; 72.7 percent in 2004).

The analysis identified 2 statistically insignificant increases in outcomes (positive change) where the increase was greater than 10 percentage points between 2001 and 2004. The analysis also identified two statistically insignificant decreases in outcomes (negative change) where the decrease was greater than 10 percentage points between 2001 and 2004.

Similar to the previous section, questions have been grouped to highlight the degree to which marinas in New England changed their use of BEPs between 2001 and 2004 (Table 5-3). Green indicates that greater than 90 percent of facilities implemented the BEP, yellow indicates between 50 and 90 percent and red means that less than 50 percent of facilities reported adoption of the BEP. In 2001, four outcomes were above 90 percent compliance (green). In 2004, three of those remained above 90 percent and one dropped below 90 percent. Of the ten BEPs used by fewer than 50 percent of facilities in 2001, one BEP was used by more than 50 percent of marinas by 2004. In 2001, ten BEPs were applied by 50 to 90 percent of facilities and in 2004, one had improved to above 90 percent adoption and two BEPs dropped to below 50 percent of marinas

**Table 5-3. Propensity Score Matching Analysis Results for Best Environmental Practices Outcomes.**

Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis	
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Estimated Difference between 2004 and 2001 Facilities [a]	Statistically Significant? [b]
<b>Oil and Fuel</b>						
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) On Site? [c]	36	2.80%	29	24.10%	0.267	Yes
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Signed By A Registered Professional Engineer? [c]	36	2.80%	17	5.90%	0.062	No
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Posted In Plain View At Oil Storage Locations? [c]	36	2.80%	16	12.50%	0.144	No
Does Above Ground Oil Storage (Incl. Piping System) Have Secondary Containment? [c]	10	50.00%	18	38.90%	-0.017	No

Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis	
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Estimated Difference between 2004 and 2001 Facilities [a]	Statistically Significant? [b]
Does Above Ground Oil Storage (Incl. Piping System) Have Leak Detection? [c]	11	45.50%	19	36.80%	0.009	No
Does Below Ground Oil Storage (Incl. Piping System) Have Secondary Containment? [c]	28	96.40%	21	85.70%	-0.062	No
Does Below Ground Oil Storage (Incl. Piping System) Have Leak Detection? [c]	28	96.40%	22	90.90%	-0.037	No
Does The Facility Have More than One Spill Prevention Procedure In Place For Fuel Dispensing? [d]	42	87.50%	34	94.40%	0.094	No
How Would You Evaluate The Effectiveness Of The Methods You Are Using To Prevent Releases? [e]	53	2.8679	49	3.1837	0.288	Yes
<b>Stormwater</b>						
Does The Marina Have A NPDES Storm Water Permit? [f]	14	100.00%	8	100.00%	0	-
Has The Marina Made Structural Changes To Minimize Surface Water Runoff?	65	69.20%	62	71.00%	0.047	No
Has The Marina Made Structural Changes To Berming?	65	55.40%	60	40.00%	-0.167	No
Has The Marina Made Structural Changes To Vegetation?	64	51.60%	62	51.60%	-0.012	No
Has The Marina Made Structural Changes To Riprap?	64	21.90%	58	44.80%	0.212	Yes
Has The Marina Made Structural Changes To Drains?	64	25.00%	55	29.10%	-0.017	No
Has The Marina Made Structural Changes To Placement Of Filters In Drains?	64	14.10%	50	42.00%	0.24	Yes
<b>Other Best Environmental Management Practices</b>						
Has The Facility Switched To Alternative Materials Or Products To Reduce Toxicity Or Other Hazards To Health, Safety, Or The Environment?	66	89.40%	57	87.70%	-0.017	No
Has The Facility Switched To Safer Paint Stripping?	41	46.30%	40	52.50%	0.071	No
Has The Facility Switched To Safer Painting?	52	73.10%	51	62.70%	-0.116	No
Has The Facility Switched To Safer MSD Odor Chemicals?	57	26.30%	44	31.80%	0.034	No
Has The Facility Switched To Dust Collection?	50	66.00%	51	78.40%	0.141	No
Has The Facility Switched To Phosphate-Free Cleaners?	53	37.70%	52	48.10%	0.098	No
Has The Facility Switched To Biodegradable Cleaners?	62	88.70%	55	72.70%	-0.174	Yes
Has The Facility Switched To Safer Antifreeze?	60	95.00%	53	96.20%	0.005	No
Does The Facility Have A Sewage Pumpout System?	65	69.20%	69	62.30%	-0.039	No

Key: Green = Indicator value above 90 percent; yellow = indicator value between 50 and 90 percent; and red = indicator value below 50 percent.

[a] The estimated difference reflects the percentage point difference between the treatment group and control group included in the analysis. Due to the nature of PSM methods, this will not be the same as the difference between the 2001 average and the 2004 average.

- [b] This column indicates whether the PSM analysis found the difference between the 2001 and 2004 marinas to be statistically significant using the 90 percent level of confidence (10 percent significance level).
- [c] This outcome is only a regulatory requirement if an above ground storage tanks holds 1,320 gallons or greater and/or a below ground storage tank has a capacity of 42,000 gallons or more; otherwise, it is likely a best environmental practice. Therefore, the PSM analysis for this outcome includes only facilities where site visit data indicates no tanks above these limits are on the premises (i.e. if the answer to either of the last two parts of question 4A of the Checklist is “No”). See Appendix B for the complete questions.
- [d] Facilities are required to have at least one spill prevention procedure in place for dispensing fuel. For facilities that are in compliance with this regulatory requirement, this outcome is determined as a best practice based on whether the facility has at least two of the following procedures in place: an overfill alarm, automatic shutoff, fuel collars, employee monitoring of fueling, or other procedures.
- [e] This outcome was based on a four-point scale (where 4 was “Excellent” and 1 was “Poor”), as opposed to the rest of the outcomes in the table that all had Yes/No responses. Thus, the “Average Value For Outcome” columns (for both the 2001 and 2004 data) for this outcome contain the actual average rating for the group (as opposed to the percentage of “Yes” answers that is indicated for the other outcomes).
- [f] This outcome is only a regulatory requirement if a NPDES permit is required; otherwise, it is simply a best environmental practice. Therefore, the PSM analysis for this outcome includes only facilities where site visit data indicates no permit is required (i.e. if the answer to question 9A of the Checklist is “No”). See Appendix B for the complete question.

## **STAKEHOLDER INTERVIEWS**

Stakeholders were asked if they thought the Initiative’s materials influenced marinas’ adoption of BEPs. Interviewees viewed the Checklist as a high-level document that prompts owners to think about BEPs and leads to greater regulatory awareness but does not go into enough depth for marina owners to understand what it means to be in compliance with regulations. Interviewees felt that the Environmental Management Plan (EMP) workbook is put together well, but they were unsure if marina owners use it; many thought that distributing it by mail and through the web site probably would not result in owners filling the booklet out. While interviewees thought the workshops and training were generally informative, some found them overly technical, hindering their effectiveness to influence adoption of BEPs.

Interviewees were also asked about external factors affecting the adoption of BEPs. They suggested that employee training as an issue - marinas do not generally have the capacity to offer formal training, and the seasonal nature of the business of marinas results in a high employee turnover rate. Generally this leads to a lower overall awareness of BEPs amongst employees, which affects marinas’ and boaters’ capacity to use BEPs. Interviewees also said marinas that conduct technical work and building services currently have a shortage of skilled labor and that retaining skilled employees in general is difficult in the marinas industry. Again, issues with employee retention and knowledge of the general operations of marinas have an impact on the awareness of environmental issues and best practices at marinas.

## **CUSTOMER SATISFACTION SURVEY DATA**

The customer satisfaction survey asked respondents to rate their satisfaction with different Initiative materials with respect to selected BEPs. Table 5-4 presents the number of respondents that were “Very Satisfied” or “Satisfied” with Initiative materials’ ability to address different BEPs. Almost all respondents were very satisfied or satisfied with all Initiative materials with respect to each of the BEPs. For workshops and training, all respondents indicated that they were satisfied with the coverage of the use of closed receptacles for disposal or recycling and the installation of sewage pump-out systems. For the website, all respondents were satisfied with coverage of spill prevention procedures and use of closed receptacles. The satisfaction scores for

the guidance materials were lower overall than for workshops and training and the website. In open ended responses, stakeholders indicated that EPA’s workshops were too technical, that workshops should be no more than 1.5 hours driving distance for participants and that better publicity of the website and notification of updates and new materials will help marinas take advantage of program materials.

**Table 5-4. Number of Respondents That Were “Very Satisfied” or “Satisfied” With Initiative Materials’ Ability to Address Different Best Environmental Practices [a].**

Best Environmental Practice	Initiative Materials		
	Workshops/ Training	Web Site	Guidance Materials
Spill prevention procedures or devices (e.g. overfill alarms)	5 of 7	8 of 8	9 of 10
Use of closed receptacles for disposal or recycling	8 of 8	8 of 8	9 of 10
Clear labeling and secure storage of fluids (e.g. fuels and paints)	8 of 9	8 of 9	8 of 10
Structural changes to minimize surface water runoff (e.g. berming, filters and riprap)	6 of 11	7 of 8	7 of 10
Use of alternative practices or materials to reduce toxicity or other hazards	7 of 10	8 of 9	7 of 10
Installation of a sewage pump-out system (onshore or on-boat)	7 of 7	7 of 7	9 of 10

[a] Number of respondents (of total) that indicated that they were either “very satisfied” or “satisfied.” Respondents were asked if they had used the material in questions 1, 7 and 14 of the Customer Satisfaction Survey; the satisfaction score data refer to questions 4, 11, and 17 (see Appendix B for complete questions).

### **QUESTION 3: USEFULNESS OF THE ACTIVITIES AND MATERIALS**

#### **TO WHAT DEGREE WERE THE NEW ENGLAND MARINA INITIATIVE ACTIVITIES AND/OR MATERIALS USEFUL IN IMPROVING REGULATORY COMPLIANCE OR IMPLEMENTING BEPs?**

The customer satisfaction survey and the stakeholder interviews were designed to determine the usefulness of program resources to improving compliance and use of BEPs. That information has been documented in the findings related to questions 1 and 2.

#### **WERE NON-PROGRAM RESOURCES USEFUL?**

As for the usefulness of non-program resources, restrictions to the questions admissible under the customer service ICR limited the collection of information on non-EPA resources. The stakeholder interviews provided little additional information on non-program resources that were useful to marinas.

#### **WHAT MATERIALS DID STATES DEVELOP AND WHAT ARE STATES DOING AS PART OF THE INITIATIVE?**

Information collected during stakeholder interviews and a review of state websites revealed that states conducted activities and developed materials contributing to the New England Marinas Initiative as well as independent activities, which could be considered non-program resources. State contacts did not view their activities and materials as part of the Initiative and indicated that they had either developed their own prior to the Initiative or developed them independent of the Initiative. Region 1 noted that EPA had assisted the states in developing the materials listed in



Table 5-5 and that the states may have been unaware that Region 1 was providing that assistance as part of the Initiative. The New England Marinas Website’s links to state programs were used to find materials developed in the 2001-2005 time frame.<sup>7</sup> Table 5-5 lists some of the more prominent materials that may have been influenced by the Initiative.

**Table 5-5. Material Potentially Developed by State Using New England Marinas Initiative Assistance**

State/Agency	Materials
Connecticut Department of Environmental Protection	<ul style="list-style-type: none"> <li>• CT Clean Marina Award Checklist</li> <li>• CT Clean Marina Compliance Checklist</li> <li>• CT Clean Marina Guidebook</li> <li>• Clean Boater’s Program Tipsheets</li> </ul>
Maine Department of Environmental Protection	<ul style="list-style-type: none"> <li>• Brightwork: Best Environmental Practices Manual for Maine’s Boatyards and Marinas</li> <li>• Maine Pumpout Station Guide</li> </ul>
Massachusetts Office of Coastal Zone Management	<ul style="list-style-type: none"> <li>• Massachusetts Clean Marina Guide</li> <li>• A Guide to Selecting Pressure Washing Management Practices and Technologies: Supplement to the Massachusetts Clean Marina Guide</li> <li>• Boater Fact Sheets</li> </ul>
Massachusetts Department of Marine Fisheries	<ul style="list-style-type: none"> <li>• MA Clean Vessel Act Program Brochure</li> </ul>
New Hampshire Department of Environmental Services	<ul style="list-style-type: none"> <li>• Best environmental practices for New Hampshire Marinas, Guidelines for Environmentally Proactive Marinas</li> <li>• Best environmental practices for New Hampshire Marinas, Pocket Version</li> <li>• Management of Engine Test Tank Wastewater for Marinas, Fact Sheet</li> <li>• A Boaters Guide to Sewage Pumpout Discharge Regulations and Pumpout Stations</li> </ul>
Rhode Island	<ul style="list-style-type: none"> <li>• “RI’s Clean Marina Guidebook and other materials are under RI CRMC at: <a href="http://www.crmc.ri.gov/marinas.html">http://www.crmc.ri.gov/marinas.html</a> “</li> </ul>
Vermont	<ul style="list-style-type: none"> <li>• Marinas Web</li> </ul>

## QUESTION 4: THE CHECKLIST

### WHAT ITEMS SHOULD BE ADDED OR DROPPED FROM THE REGION 1 MARINA CHECKLIST?

#### STAKEHOLDER INTERVIEWS

To assess the need for changes in the Checklist, stakeholders were asked for overall thoughts about the Checklist as well as which items should be added or dropped. Most interviewees felt the Checklist is a useful tool to raise awareness among marina operators of regulatory issues and BEPs. However, many interviewees indicated that the Checklist overall was not appropriate for their state and that state-specific checklists might work better because of the differences in regulations between states. Interviewees also suggested that additional information on any applicable exemptions be included to avoid confusion. For instance, the hazardous waste section (Question 3) should include an option asking for the marina’s generator status because marinas

<sup>7</sup> EPA Region 1 indicated that materials developed through 2005 may have been influenced by the Initiative’s activities.

may be in a hazardous waste conditionally exempt status which is relatively less stringent. EPA Region 1 noted, however, that the Checklist is not intended as a comprehensive evaluation tool but an indicator tool that the Region can use in assessing a facility.

The EPA Region 1 lead suggested adding questions to the Checklist to determine whether marinas had come into compliance with EPRCA regulations. This would include if a marina has sulfuric acid in excess of one thousand pounds and if a marina has chlorine in excess of one hundred pounds on the premises, as well as a question about whether or not hazardous waste determinations have been completed (and a follow-up question concerning whether the determinations have been documented).

Interviewees suggested that data that are already available to EPA on the web should be removed from the Checklist (e.g. Question 9, concerning NPDES permits) to make the document shorter and avoid confusion. It was also noted that parts of the section on storm water are required by all marinas, so the questions in this section should ask whether the marina is in compliance, not whether the marina is subject to compliance. In addition, one interview pointed out that Question 4B (SPCC) on the checklist needs to be updated because marinas can now certify themselves.

Interviewees thought that because pressure washing has been a focus for EPA in recent years, it is almost a non-issue now and could be removed from the Checklist. An interviewee was concerned that Question 8 (MSDS) refers to an Occupational Safety and Health Administration (OSHA) rule, and if so, suggested it could be removed from the Checklist as well. Other interviewees thought the Checklist should include questions on bilge water, boat washing, and wetlands. In addition, interviewees said questions on pollution prevention, parts washing, engines, and test tank water discharge would be helpful.

In order to make the Checklist more useful in general to marina operators, interviewees suggest making the Checklist more explanatory because the typical marina owner is probably unfamiliar with a lot of the details in the Checklist. One interviewee suggested adding a footnote to link directly to the EPA website and materials on the subject, so users could dynamically see the rule and documentation (information on the actual rule, how to comply with it, and best practices related to the issue).

## **CUSTOMER SATISFACTION SURVEY**

One of the goals of the Checklist is to increase awareness among marinas of BEPs and regulatory requirements. The customer satisfaction survey did not ask respondents about the Checklist specifically, but the survey did ask respondents to indicate how many years of experience they have had with a number of BEPs. Table 5-6 presents the percent of respondents with less than three years of experience with a number of best environmental practices. This suggests more items related to the best practices with the highest percent of respondents with less than 3 years of experience (i.e. the best practices that marina owners/employees seem to have the least amount of experience with) could increase awareness among users. Respondents have the least amount of experience with implementing structural changes, alternative practices to reduce toxicity, and installation of sewage pump-out systems

**Table 5-6. Percent of Respondents with Less than Three Years of Experience for Selected Best Environmental Practices.**

Best Environmental Practice	Percent of Respondents with Less than 3 Years of Experience
Structural changes to minimize surface water runoff (e.g. berming, filters and riprap)	27.3%
Use of alternative practices or materials to reduce toxicity or other hazards	27.3%
Installation of a sewage pump-out system (onshore or on-boat)	27.3%
Spill prevention procedures or devices (e.g. overfill alarms)	22.7%
Use of closed receptacles for disposal or recycling	13.6%
Clear labeling and secure storage of fluids (e.g. fuels and paints)	13.6%

## QUESTION 5: ENVIRONMENTAL HEALTH OF MARINA COMMUNITIES

### TO WHAT EXTENT DID THE NEW ENGLAND MARINA INITIATIVE LEAD TO HEALTHIER MARINA COMMUNITIES?

To *reliably* assess water quality impacts from marinas, data should be collected before (e.g., in 2000) and after the Initiative (e.g., 2004) from fixed monitoring stations *in the immediate vicinity of* marinas. Of stakeholders interviewed none could identify data sources on water quality useful to assessing water quality impacts of marinas. Some interviewees suggested possible sources of data but indicated that any data found were likely to be unreliable. Three potential sources of water quality data were reviewed: 1) U.S. Geological Society (USGS) Water Data for the Nation<sup>8</sup>, 2) EPA National Water Quality Inventory Report to Congress (305(b) reports)<sup>9</sup>, and 3) EPA’s STORET (short for STOrage and RETrieval) data<sup>10</sup>. Each of the three of the potential sources on water quality data was comprehensive in nature but each source had limitations for use in the evaluation.

- *U.S. Geological Society (USGS) Water Data for the Nation*<sup>11</sup>—these data provide information on flows and quality of waterways in the United States. Data are collected at different sites across the country. However, effective use of these data would require obtaining exact latitude and longitudes for marinas and matching those to the lat-longs of the data collection sites, a process beyond the scope of this analysis. It is unlikely that this process would reveal appropriate sampling sites near marinas. Additionally, the data collection sites in the USGS data do not necessarily provide the same data over time and some represent only one-time data collections.
- *EPA National Water Quality Inventory Report to Congress (305(b) reports)*<sup>12</sup>—these data are compiled to track general water quality conditions in the United States. The data track supported use by type of water body (e.g., coastline, bay, etc.). There are some data at the watershed level, but for the most part these data summarize

<sup>8</sup> <http://waterdata.usgs.gov/nwis>

<sup>9</sup> <http://www.epa.gov/305b/>

<sup>10</sup> <http://www.epa.gov/storet/index.html>

<sup>11</sup> <http://waterdata.usgs.gov/nwis>

<sup>12</sup> <http://www.epa.gov/305b/>

- conditions at the state level, especially in older reports (pre-2002). Additionally, the data rely on assessments that were performed. Both Maine and Massachusetts have significant amounts of coastlines that were not assessed.
- EPA’s STORET (short for STOrage and RETrieval) data<sup>13</sup>—the STORET data provide a repository of water quality measurement data from different sites across the country. However, as with the USGS data, use of these data for this analysis would require obtaining exact lat-longs for marinas and matching those to the lat-longs of the data collection sites. Furthermore, the data contained in STORET may not contain enough data points over time to support the analysis needed for this project. Although each is comprehensive in nature, each source had limitations for use in the evaluation.

## **QUESTION 6: IMPROVEMENTS TO THE INITIATIVE**

### **WHAT RECOMMENDATIONS FOR IMPROVEMENT TO THE PROGRAM STRUCTURE CAN BE MADE?**

#### **STAKEHOLDER INTERVIEWS**

Stakeholders identified specific improvements that can be made to the program. They made suggestions regarding: (1) improvements to the checklist; (2) improvements to the workshops and seminars; (3) clarification of state-specific requirements and regulations; (4) providing more on-site demonstrations of BEPs and (5) providing more outreach efforts.

Interviewees said that though the EMP workbook is well structured few marinas use it. They suggested that EPA hold seminars that teach owners how to properly use the workbook and also make it available in an electronic—and more interactive—form. Some interviewees said that the workshops and seminars currently offered are overly technical and that regulation requirements should be translated into plain English. A trade association representative could attend workshops as a facilitator since they may have a better understanding of regulations in the real-world. Interviewees felt that a trade association representative would have a better understanding of the issues marinas face and that the audience would be more comfortable with this format than an EPA-only workshop or seminar.

Almost all interviewees highlighted the state-to-state differences in requirements as a problem. Additional language could be added (“The federal rule says...”) to Initiative materials to minimize confusion about state vs. federal regulations. Interviewees noted that more on-site presence by EPA staff would be useful. They suggested that EPA bring someone along who is qualified to give state-specific compliance information during outreach efforts. Region 1 suggested that demonstration of BEPs and new technologies on-site is an effective way to provide training and suggested scaling up this type of assistance. Also, since some marina owners may not be comfortable with visits from EPA representatives, the Region could send a regulation expert not affiliated with the agency to conduct site visits and provide technical assistance.

---

<sup>13</sup> <http://www.epa.gov/storet/index.html>

## **QUESTION 7: TRANSFERRING THE INITIATIVE**

### **AMONG EPA REGIONS AND STATES IS THERE INTEREST IN APPLYING THE REGION 1 MARINA INITIATIVE APPROACH?**

The data source identified to answer this question, stakeholder interviews, provided little information regarding specific states or regions with an interest in the applying the Initiative. EPA Region 1 considered itself, and stakeholders viewed Region 1, as a partner with the states and other stakeholders. Stakeholders, however, were unaware that Region 1 had named the Initiative *The New England Marinas Initiative*. All of the interviewees were familiar with the work of Larry Wells, the EPA Region 1 lead for the New England Marinas Initiative. Each respondent was familiar and had experience with many of the components of the Initiative as they are represented in the Initiative's logic model. The various components of the initiative were generally viewed favorably and no respondent suggested terminating any of the components of the Initiative with which they were familiar.

It was not the intent of the Region to formally promote the effort as a regional initiative. The existence of a formal Initiative was unknown to respondents; most did not have a definitive view on whether the Initiative should be transferred to another region or State. Specific considerations for transferability of the New England Marinas Initiative will be considered further in Chapters 4 (Discussion) and 5 (Recommendations).

---

## CHAPTER 4: DISCUSSION

---

Given growing emphasis on the value of networks and collaborative partnerships in achieving measurable environmental goals, the EPA Region I New England Marinas Initiative is a valuable model that demonstrates lessons about developing stakeholder networks, improving regulatory compliance and adoption of BEPs, articulating and clarifying program theory, and measuring and evaluating performance.

Overall, EPA, states, trade associations and marina owners, and other stakeholders have established a strong foundation for the maintenance and growth of the New England Marinas Initiative. That the Initiative took action on the implementation stage as described in the program logic model (See Figure 2-1) is evidence of the Initiative's success in creating partnerships and a network of individuals and organizations with an interest in regulatory compliance and adoption of BEPs at marinas. According to the Initiative leaders and as documented in the logic model, creating partnerships and enhancing the assistance provider network were critical to the success of the Initiative. The implementation stage, including the development and delivery of education and technical assistance, would not have been possible without thorough execution of the project planning and needs assessment stage.

In the implementation stage, statistically valid samples of the population of marinas in New England and the use of a measurement instrument (the Checklist) to collect pre- and post-implementation data enabled a rigorous quasi-experimental study of the validity of multiple aspects of the program's theory. The statistical analysis, using a method called propensity score matching (PSM), of pre- and post-implementation data detected few improvements in regulatory compliance and adoption of BEPs among marinas in New England between 2001 and 2004. Though the PSM method makes a definitive statement that a set of the Initiative's desired outcomes were not achieved between 2001 and 2004, the analysis provides no insights as to why this is the case, whether outcomes may be achieved in the future, or what factors influenced changes in compliance and use of BEPs. Results of the PSM analysis (both positive and negative) and analysis of qualitative data indicate compliance improvements in several areas and encourage the use of all of the available data and information to more completely answer such questions as "Why are we where we are?" and "How can we improve?" For the Marinas Initiative, there is much to be learned by considering these two evaluative questions in the context of the Initiative's program specific evaluation questions.

### **Theory of Change**

The theory of change – the steps necessary to bring about long-term goals – illustrated in the *implementation stage* of the Initiative's logic model (Figure 2-1) is not as clear as the much more detailed *planning and needs assessment stage*. This suggests that the implementation stage has not been as thoroughly considered. For example, exactly which educational activity, product, or service (e.g. workshop or EMP workbook or website) will lead to achieving which and what kind of change in understanding (e.g. understanding of environmental significance, regulatory compliance, or how-to skills)? Without articulating these causal linkages more explicitly, there is an increased likelihood that the Initiative operates on inaccurate and/or incomplete assumptions about how the program will achieve its goals, which, in turn, could compromise the Initiative's capacity to measure its effectiveness. For instance, the design of the Initiative

assumes that education and technical assistance lead to increased knowledge which leads to actions taken by marina owners which results in better compliance at marinas and more frequent use of BEPs. Although these are two major assumptions on which the success of the Initiative is based, there is little evidence of their validity.

First, there is limited measurement of learning. If the Initiative is based on the assumption that learning leads to change, establishing the effectiveness of education strategies is critical. Stakeholders think the EMP booklet is designed well but were unsure if marina owners use it; they agree that workshops and training are informative but also agree that they are overly technical and thus unclear and confusing. The Initiative resulted in a plethora of materials and activities aimed improving compliance and use of BEPs and the Initiative recognizes the importance of their usefulness to marina owners as evidenced by an evaluation question about that issue. Usefulness was not clearly defined by the Initiative but its definition could be clarified through further development of the logic model. For instance, is a particular activity or education tool intended to be useful in improving understanding or a skill and which one, changing behavior, or building networks and partnerships? The materials could be useful in achieving those things but other factors prevent use (access, cost, time, and relevance) or marina owners could have viewed the materials as useful but applied the tool outside the measurement window (2001-2004). A starting place for hints at changes in awareness and learning amongst marina owners could be found by looking for changes in “*don’t know*” responses on the checklist between 2001 and 2004. Significant changes in certain outcomes could be tracked back to the part of the activity or materials addressing that issue to search for insights more effective educational tools or strategies. For instance, was an illustration, table or anecdote used more or less often when a significant change in “*don’t know*” is detected in the analysis?

Second, the initiative did not necessarily measure a change in behavior or the actions of marina owners but a change in condition which would be caused by a change in behavior. Measurement documented change in the status of the marina and did not document the intent, plans or ongoing actions of marina owners with respect to compliance and BEPs. This suggests that the Initiative measured the change in condition (a longer-term outcome) and did not measure shorter term outcomes such as change in awareness, understanding, skills, planning, or action – all of which are integral to the assumptions on which the Initiative is based.

The PSM analysis identified relatively few positive changes in desired outcomes between 2001 and 2004; however, a timeframe is not specified in the logic model and outcomes may be realized outside the 2001-2004 measurement window. For example, if assistance to marinas was spread over 3 years, marinas may: 1) access assistance in the third year, 2) apply what was gained from assistance after the 3<sup>rd</sup> year, 3) have access to assistance only in the 3<sup>rd</sup> year, or 4) education and assistance materials and activities improved during the three years and marina owners did not have access to the best quality assistance until the third year. In each of these cases, marina owners would have no opportunity or only a small window of time to act on what they learned from education and outreach before the second measurement in 2004.

Both self-disclosures of violations and EPCRA Tier II filings provide some evidence that significant change may have gained momentum after 2004 (Table 5-2). First, the drop in the number of self disclosures at marinas after the 2004 measurement could reflect increased

compliance at marinas (fewer violations to disclose) or perhaps less motivation to disclose the violations (due to less Initiative-related activities). If measurement continued at regular intervals, the former (fewer violations) could be ruled out, and if either is true, the Initiative may have been responsible for the effect. Second, trends in completed EPCRA Tier II filings between 2001 and 2004 (89) and between 2004 and 2007 (237) is strong evidence that the Initiative may be influencing marinas to make the appropriate filings. These two examples demonstrate the potential benefits of going beyond, if possible, before- after-assessment of marinas' status to get a clearer picture of trends in intent, behavior, and condition.

A few key pieces of information could be useful to understand and determine appropriate measurement intervals. First, tracking the effectiveness of the education materials and approaches will help to hone the use of education and outreach strategies (i.e. do recipients of education activities and materials gain the knowledge and skills necessary to achieve the Initiative's compliance and BEP goals?). Second, general information on the time and money required for a marina owner to act on specific compliance and best practice indicators of interest will add insight as to what is feasible to change in a given timeframe. Understanding what an owner must invest to come into compliance or adopt a BEP may help to craft and prioritize the use of indicators that will detect change within an appropriate measurement window. Third, the content and timing of deployment of measurement instruments can be informed by a general understanding of marina owners' intentions to act. That is, given a set of compliance issues or BEPs, how does the marina owner prioritize when and what to do to improve compliance and use of BEPs?

### **Prioritization**

Some stakeholders suggested dropping a few indicators from the checklist and others suggested that the checklist should include more indicators of environmental compliance or BEPs. These suggestions provide evidence of important progress toward a willingness to discuss and general awareness of challenging environmental issues – critical objectives of the Initiative. The Initiative can use this evidence as a solid stepping stone to improve communication amongst stakeholders and direct future education and technical assistance.

Besides the benefits of increasing awareness of environmental compliance and BEPs among stakeholders, suggestions that items should be added or dropped from the checklist hint at the perception amongst stakeholders that, for a wide variety of reasons, some issues are more important than others. The creation of the checklist itself as well as categories within the checklist illustrates the Region's process of prioritization. However, specific items or groups of items were not weighted more or less important within the compliance areas. Prioritization within compliance areas presents an opportunity to improve the focus of education and technical assistance as well as refine the development, application and use of measurement instruments.

The statistically valid sampling approach applied for the collection of site data can be used for purposes beyond the PSM analysis. The approach enabled the categorization of compliance and BEP outcomes (indicated by red, yellow and green in Tables 5-1 and 5-3) so that it is clear which compliance outcomes are achieved by greater than 90% of marinas across the population of New England marinas as well as which outcomes are achieved by less than 50% of marinas in the region. A better understanding of levels of compliance, regardless of change, could provide a



solid foundation for prioritizing planning and action, especially if the Initiative groups and weights items on the checklist according to criteria such as feasibility, importance, cost, time, and environmental impact.

There are many potential explanations for an item that is red (<50% compliance or use) in 2001 to remain red in 2004. The marina owner may not be aware of the need to change or factors such as cost, time, complexity, or lack of knowledge and skills may prevent or delay change. Or, if an item remains green pre- and post- implementation then the outcome may be more easily achieved or is already integral to the culture and operations of marinas and may require less frequent measurement. Additional insight is available where change is observed. For example, a large percentage change, either within or between categories, suggests that obstacles to change in the short term are not so great that the indicator is fixed. Those items may be easier or more likely to change than others, whereas some, such as PWW, may be prohibitively expensive in the short-term so that detecting change in the measurement window is less likely. Using appropriate and relevant criteria to classify and group each item of compliance and BEPs, the Initiative can better prioritize where and how to direct resources and effort.

Stakeholders report dual and seemingly conflicting purposes for the checklist. Marina owners thought that the lack of state-specific information made it too general and sometimes confusing. The checklist has both been described as an indicator tool for EPA Region 1 to assess a facility as well as a tool to raise marina owners' awareness of environmental issues. The checklist achieved the former but struggles with the latter due to, among other reasons, state-to-state regulatory variations. If the checklist is to raise awareness amongst all marinas, it needs to account for state variations to increase specificity and reduce confusion amongst marina owners. Increasing specificity on the checklist would enable members of the assistance network to use the checklist data to prioritize planning and create opportunities to increase efficiency at the state and local level.

### **Environmental Health**

Improving the environmental health of marinas communities is one of the intended long-term outcomes of the Marinas Initiative. Neither stakeholder interviews nor a search of environmental databases yielded data sources obviously useful in answering questions about the environmental impacts of the Initiative. Some of the reasons for the lack of relevant data are documented in a recent evaluation of EPA's Temporarily Integrated Monitoring of Ecosystems (TIME) and Long Term Monitoring (LTM) surface water monitoring programs (<http://www.epa.gov/evaluate/pdf/FactSheetTIME-LTM.pdf>). The evaluation found that the TIME/LTM data was managed by a small number of researchers, not widely accessible, and primarily collected to assess the environmental status of surface waters and not generally useful for assessing the environmental outcomes of policies or programs such as the Marinas Initiative.

Though the evaluation did not find clearly useful ecological data sources, the Initiative has not asked clear questions about the environmental health surrounding marinas or the impact of the Initiative on environmental conditions. With clear questions about environmental health related to compliance and BEP priorities, the initiative can explicitly identify data sources and gaps. For instance, if curbing the use or runoff of a particular chemical or group of hazardous wastes is a top priority, then the Initiative can focus on determining the availability of pollutant-specific data

or investigate the feasibility of collecting it. Region 1 identified checklist items (e.g. NPDES permits) related to regulations protecting water quality surrounding marinas (Table 5-1). With expert input from stakeholders, the Initiative may be able to use existing measures or develop surrogate measures for environmental impact of Initiative.

### **Communication**

The theory and goals of the Initiative place a strong emphasis on networks, partnerships and coordination across all stakeholders including marinas. However, the customer satisfaction survey, distributed by mail, suffered a very low response rate which reduced the quantity and quality data and information available for the evaluation. A mail survey during the high season for marinas was an inefficient way to collect data and the complications with the list of physical addresses was only one issue preventing communication with the community of marina owners. Email addresses, a marinas listserve, social media (Web 2.0 tools such as LinkedIn and Twitter), and instant and text messaging offer the Initiative powerful ways to communicate with their customers and create the option for the Initiative to use web-based or email surveys to gather data and information. Creating, maintaining and building a social network, like the network of compliance assistance providers and marina owners, requires multiple types of contact information and means of communication to suit the membership's diverse communication styles and preferences. The communications tools provided to the network provide constant conduits for stakeholder interaction and feedback as well as opportunities to efficiently distribute information to stakeholders.

It is likely that marina owners did not recognize the significance of the survey and did not realize it was a part of the New England Marinas Initiative. Stakeholders were aware of Region 1's work with marinas, and States in particular were grateful for EPA's assistance in developing education materials for marinas. However, representatives from State agencies were clear that the Initiative did not contribute to the development of the education materials listed in Table 5-6. Stakeholders were unaware of an "Initiative" specifically aimed at improving compliance and use of BEPs amongst marinas in New England. The lack of awareness of the New England Marinas Initiative may have played a role in marina owners missing the connection between the customer satisfaction survey and the Initiative and resulted in fewer completed and returned surveys. If the formal, cooperative and concerted effort across many stakeholders is not known as the New England Marina Initiative, it is more difficult to communicate the Initiative's value and increase demand for the program. It is also more difficult for others to request the information and support necessary to replicate the program if they are unaware that it (the Initiative) exists. Inefficiently communicating the successes and lessons learned to those who would gain from that information reduces the value of the Initiative and the benefits that it has to offer.

---

## CHAPTER 5: RECOMMENDATIONS

---

### **RECOMMENDATION 1: CLARIFY THE THEORY OF CHANGE**

The planning and needs assessment stage, as depicted in the logic model, was detailed and successful as is evident by the implementation of the Initiative and its various components. Improve the theory of the program's implementation stage by clarifying which activities and materials are intended to lead to which desired change. For instance, which program activity or output is intended to achieve which BEP for which audience? Clearly articulate how measurement information will be used and by whom in order to improve the utility of measurement instruments and to reduce confusion about the use of measurement data.

### **RECOMMENDATION 2: EMPHASIZE NEAR-TERM, PRACTICAL OUTCOMES**

Because the assumption that providing knowledge to marina owners will lead to behavior change is unproven, changes in behavior should be the foundation of the Initiative's learning objectives. Education and technical assistance materials and activities should teach to change the intentions of owners as well as their use of skills and knowledge that will improve compliance and use of BEPs. Use peer teaching-learning education approaches when possible as a means to increase the practicality of education and assistance activities.

Determine and hone the effectiveness of education and technical assistance tools and strategies through a combination of ongoing measurement and evaluation of the Initiative, pilot testing, focus groups, and learning from this evaluation. Where there are many options for achieving the same critical objective (e.g. change in a high priority compliance item), consider measuring the relative effectiveness of different approaches (activities, materials) and allocate resources according to which ones work best. Pay close attention to the contextual influences on the program such as employee turnover rate. That the turnover rate is high could suggest that marina owners should not be taught what to do with as much emphasis as they are taught how to achieve regulatory compliance and BEPs through seasonal employees.

### **RECOMMENDATION 3: PRIORITIZE GOALS AND OBJECTIVES**

Because there are a large number of desired outcomes and limited resources available to achieve them, use the data and analyses in this report (e.g. levels of and changes in compliance) to prioritize program goals and objectives that serve to order desired outcomes and the resources allocated to achieving them. Use priority goals and outcomes to prioritize learning objectives and necessary resources for developing and deploying education and assistance activities and materials. Clearly defined goals and objectives can be used as evidence to guide decisions about resources allocated to measurement activities. For instance, the highest priority learning and behavior change objectives are the first to receive the most measurement attention (funding, sophistication, etc.).

### **RECOMMENDATION 4: SPECIFY ENVIRONMENTAL OBJECTIVES**

To support goal prioritization, identify specific pollutants and/or ecological characteristics most relevant to the health of marina communities in New England. Document the existence of or gaps in data and information related to those pollutants and/or ecological characteristics and document what is needed to fill those gaps. Based on access to information, consider specifying

key measurable environmental objectives for the program. Consider whether compliance, BEPs and other existing indicators serve as surrogate measures of environmental health in the near term (e.g. NPDES reports).

### **RECOMMENDATION 5: FORMALIZE THE INITIATIVE**

Actively brand and promote the New England Marinas Initiative to improve communications with program partners as well as other local, state and regional governments and agencies that could benefit from implementing the program or its components.

Opportunities to formalize and brand the Initiative include:

- Establishing an advisory group of key stakeholders to lead or guide the Initiative's development and implementation.
- Drafting a New England Marina Initiative strategic plan or Memorandum of Understanding and a budget history of the Initiative.
- Formalizing and improving communication within the Initiative, including the compliance assistance network and marina owners, through a combination of:
  - The collection and use of more and diverse contact information (home phone, cell, email, web address)
  - Social media (LinkedIn, Twitter, Blogs);
  - Regular communications (listserve, webinars, conference calls, survey monkey); and
  - Regular events (annual or semi annual conferences, workshops).
- Giving multiple people or organizations access to contact information so that the loss of one member of the network does not affect the functioning and usefulness of the network to all its members.

---

## REFERENCES

---

Caliendo, Marco and Sabine Kopeinig, 2005. "Some Practical Guidance for the Implementation of Propensity Score Matching," IZA Discussion Paper No. 1588, May.

Rosenbaum, P. and D. Rubin, 1983. "The Central Role of the Propensity Score in Observational Studies of Causal Effects," *Biometrika*, vol. 70, pp. 41-50.



---

## **APPENDIX A: INTERVIEW GUIDE FOR STAKEHOLDER INTERVIEW**

---

### **INTERVIEW QUESTIONS FOR STAKEHOLDERS**

#### **BACKGROUND/CONTEXT**

1. Describe your involvement in the New England Marina Workgroup
2. How long have you been involved with the program?

#### **STATE OF MARINA SECTOR**

3. What do you see as the current environmental challenges facing the marina sector?
4. What economic obstacles may influence a marina's ability to meet regulatory requirements or to use best environmental practices?
5. What other factors (e.g., marina owners, marina industry, boaters) may influence marinas ability to meet regulatory requirements or to use best environmental practices?

#### **PROGRAM MATERIALS/RESOURCES**

6. The Marina Checklist (sent along with this set of questions) was designed as an environmental indicator tool to allow marina owners and assistance providers to determine to what degree that they are in regulatory compliance and implementing best environmental practices. As you review the checklist are there any items that you would add or ones that you would remove?
7. Are you familiar with any other guidance materials developed by the New England Marina Workgroup (e.g., Marina Environmental Management Plan, storm water permit fact sheet)?
  - 7a. [If yes] Do you have any recommendations on how the materials could be improved?
  - 7b. [For state agencies] How did your participation in the marina initiative influence your state's compliance assistance efforts? [If yes] Please describe.
8. Have you attended any workshops or training demonstrations that EPA has participated in? [If yes], do you have any suggestions on how to improve these workshops?

#### **IMPROVING PROGRAM STRUCTURE**

9. EPA is interested in recommendations you have regarding how the program began and was implemented. Do you have any suggestions related to:

- Clarifying policies
- Streamlining procedures
- Enhancing communication systems
- Ensuring accountability of the program.

10. Do you have any lessons learned from your participation in this marina workgroup that you would to pass on to similar workgroups?

### **HEALTHIER MARINA COMMUNITIES**

11. Are you aware of any environmental indicator data that would help measure the impact of marinas on the environment for marinas that you are familiar with?



---

## APPENDIX B: EPA REGION 1, MARINA CHECKLIST FOR DATA COLLECTION DURING SITE VISITS

---

US Environmental Protection Agency, New England

OMB#2021-0022

### MARINA CHECKLIST

For All Questions, Please Use:

Y: Yes    N: No    DK: Don't Know    NA: Not Applicable

#### Facility Type

1. a. How many employees work at the facility during peak recreational boating season? Full-time \_\_\_\_ Part-time \_\_\_\_  
b. How many boats(capacity) are moored at the facility? \_\_\_\_ Docked? \_\_\_\_ Stored on land? \_\_\_\_
2. a. Are maintenance or repair operations performed at the facility? \_\_\_\_  
b. If yes, are these primarily customer do-it-yourself activities? \_\_\_\_

#### Hazardous Waste

3. a. Are manifests documenting hazardous waste shipments kept, going back at least 3 years? \_\_\_\_  
b. Do employees receive training in: Proper handling of wastes? \_\_\_\_ Emergency procedures? \_\_\_\_  
c. Are quantities of hazardous waste generated by the marina calculated each month, to determine what size generator the marina is? \_\_\_\_  
d. Are all hazardous wastes stored: In labeled containers? \_\_\_\_ In a dedicated storage area? \_\_\_\_ Indoors or covered? \_\_\_\_ In an area with an impervious floor? \_\_\_\_ With storage area spill containment? \_\_\_\_  
e. Are all hazardous wastes shipped with a properly licensed transporter? \_\_\_\_

#### Oil and Fuel

4. a. Is oil (including motor fuel) stored above ground in any size tank(s) with a total aggregate volume over 1320 gallons? \_\_\_\_  
Below ground in any size tank(s) with a total aggregate volume over 42000 gallons? \_\_\_\_  
b. Is a Spill Prevention, Control and Countermeasure plan (SPCC):  
On site? \_\_\_\_ Signed by a registered professional engineer? \_\_\_\_ Posted in plain view at oil storage locations? \_\_\_\_
5. a. Does **above** ground oil storage (including piping system) have: Secondary containment? \_\_\_\_ Leak detection? \_\_\_\_  
b. Does **below** ground oil storage (including piping system) have: Secondary containment? \_\_\_\_ Leak detection? \_\_\_\_

- c. Are spill prevention procedures in place for:  
 Receiving oil from a supplier? \_\_\_\_ Transferring oil within the facility? \_\_\_\_  
 Waste oil disposal? \_\_\_\_
6. a. Does the facility have spill prevention procedures in place for fuel dispensing? \_\_\_\_  
 Overfill alarm? \_\_\_\_ Automatic shutoff? \_\_\_\_ Fuel collars to capture splash/drips? \_\_\_\_  
 Employee monitoring of fueling? \_\_\_\_ Other? \_\_\_\_\_
- b. Is equipment available and procedures in place to contain a spill at the dispenser location? \_\_\_\_
- c. How would you evaluate the effectiveness of the methods you are using to prevent releases?  
 Excellent \_\_\_\_ Good \_\_\_\_ Fair \_\_\_\_ Poor \_\_\_\_

**Hazardous Materials**

7. Has the amount of each hazardous material stored onsite been calculated (including motor fuel in above-ground systems of greater than 10,000 pounds capacity) to determine if reporting to the Local Emergency Planning Committee is necessary? \_\_\_\_
8. Are up to date Material Safety Data Sheets (MSDS) for all hazardous chemicals kept on file? \_\_\_\_ Used for training all employees handling hazardous chemicals? \_\_\_\_

**Storm Water**

9. a. Is a National Pollutant Discharge Elimination System (NPDES) Storm Water Permit required of this facility? \_\_\_\_  
 b. Does the marina have a NPDES Storm Water Permit? \_\_\_\_
10. a. When pressure washing boats coated with ablative paints, are any efforts undertaken to prevent removed material from releasing to water? \_\_\_\_ from contaminating land? \_\_\_\_  
 b. Are blasting, other paint preparation and painting activities contained or controlled to prevent abrasives, paint chips, and over spray from being released to the water? \_\_\_\_ to land? \_\_\_\_ to protect employees? \_\_\_\_  
 c. Are all engine fluids promptly transferred from parts, drip pans, used filters and other containers to closed receptacles for disposal or recycling? \_\_\_\_  
 d. Are fuels, solvents and paints stored in a protected, secure location, away from drains? \_\_\_\_ Plainly labeled? \_\_\_\_
11. Has the marina made structural changes to minimize surface water runoff? \_\_\_\_ Berming? \_\_\_\_  
 \_\_\_\_\_  
 Vegetation? \_\_\_\_ Riprap? \_\_\_\_ Drains? \_\_\_\_ Placement of filters in drains? \_\_\_\_  
 Other? \_\_\_\_\_

**Other**

12. Has the facility switched to alternative materials or products to reduce toxicity or other hazards to Health, safety or the environment? \_\_\_\_ Safer paint stripping? \_\_\_\_ Safer painting? \_\_\_\_

Safer MSD odor chemicals? \_\_\_\_\_ Dust collection? \_\_\_\_\_ Phosphate free cleaners?  
\_\_\_\_\_ Biodegradable cleaners? \_\_\_\_\_ Safer antifreeze? \_\_\_\_\_ Other?  
\_\_\_\_\_

13. Does the facility have a sewage pump out system? \_\_\_\_\_ Onshore \_\_\_\_\_ Boat \_\_\_\_\_ How  
many gallons (approx) do you pump out per week? \_\_\_\_\_ Do you use Clean Vessels  
Act funds? \_\_\_\_\_

14. Has the marina taken any action to improve environmental performance not included above?  
Please  
explain \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*This checklist does not include all marina requirements and preferable practices. For further  
information, see EPA New England's regional marina website at:  
(<http://www.epa.gov/region1/marinas>) . In addition, your comments or suggestions can be sent  
to: U.S. EPA New England, Mail Code SPP-Marinas, One Congress St., Boston, MA, 02114*

**Table B-1. Categorization of Checklist Items Between Regulatory Compliance and Best Environmental Practices Outcome Categories.**

Question #	Description	Regulatory Compliance Measure	Best Environmental Practice Indication
<b>Hazardous Waste</b>			
3a	Are manifests documenting hazardous waste shipments kept, going back at least 3 years?	X	
3b	Do employees receive training in <b>proper handling of wastes</b> ?	X	
	Do employees receive training in <b>emergency procedures</b> ?	X	
3c	Are quantities of hazardous waste generated by the marina calculated each month, to determine what size generator the marina is?	X	
3d	Are all hazardous wastes stored in <b>labeled containers</b> ?	X	
	Are all hazardous wastes stored in a <b>dedicated storage area</b> ?	X	
	Are all hazardous wastes stored <b>indoors or covered</b> ?	X	
	Are all hazardous wastes stored in an area with an <b>impervious floor</b> ?	X	
	Are all hazardous wastes stored with <b>storage area spill containment</b> ?	X	
3e	Are all hazardous wastes shipped with a properly licensed transporter?	X	
<b>Oil and Fuel</b>			
4a	Is oil (including motor fuel) stored <b>above</b> ground in any single tank with over <b>660</b> gallons capacity? <sup>[a]</sup>		
	Is oil (including motor fuel) stored <b>above</b> ground in total aggregate capacity of over <b>1,320</b> gallons capacity?		
	Is oil (including motor fuel) stored <b>below</b> ground in total aggregate capacity of over <b>42,000</b> gallons?		
4b	Is a Spill Prevention, Control, and Countermeasure plan (SPCC) <b>on site</b> ?	X <sup>[b]</sup>	X <sup>[c]</sup>
	Is a Spill Prevention, Control and Countermeasure plan (SPCC) <b>signed</b> by a registered professional engineer?	X <sup>[b]</sup>	X <sup>[c]</sup>
	Is a Spill Prevention, Control and Countermeasure plan (SPCC) <b>posted</b> in plain view at oil storage locations?	X <sup>[b]</sup>	X <sup>[c]</sup>
5a	Does <b>above</b> ground oil storage (including piping system) have: Secondary containment?	X <sup>[b]</sup>	X <sup>[c]</sup>
	Does <b>above</b> ground oil storage (including piping system) have: Leak detection?	X <sup>[b]</sup>	X <sup>[c]</sup>
5b	Does <b>below</b> ground oil storage (including piping system) have: Secondary containment?	X <sup>[b]</sup>	X <sup>[c]</sup>

Question #	Description	Regulatory Compliance Measure	Best Environmental Practice Indication
	Does <b>below</b> ground oil storage (including piping system) have: Leak detection?	X <sup>[b]</sup>	X <sup>[c]</sup>

Question #	Description	Regulatory Compliance Measure	Best Environmental Practice Indication
5c	Are spill prevention procedures in place for: Receiving oil from a supplier?	X	
	Are spill prevention procedures in place for: Transferring oil within the facility?	X	
	Are spill prevention procedures in place for: Waste oil disposal?	X	
6a	Does the facility have spill prevention in place for dispensing fuel?	X	
	Does the facility have an overfill alarm?		X <sup>[d]</sup>
	Does the facility have automatic shutoff?		X <sup>[d]</sup>
	Does the facility have fuel collars to capture splash/drips?		X <sup>[d]</sup>
	Does the facility have employee monitoring of fueling?		X <sup>[d]</sup>
	Does the facility have other spill prevention procedures? (fill in)		X <sup>[d]</sup>
6b	Is containment in place in case of a spill at dispenser location?	X	
6c	How would you rate the effectiveness of the methods you are using to prevent releases?	X	X
<b>Hazardous Materials</b>			
7	Has the amount of each hazardous material stored onsite been calculated (including motor fuel in above-ground systems of greater than 10,000 pounds capacity) to determine if reporting to the Local Emergency Planning Committee is necessary?	X	
8	Are up to date Material Safety Data Sheets (MSDS) for all hazardous chemicals <b>kept on file</b> ?	X	
	Are up to date Material Safety Data Sheets (MSDS) for all hazardous chemicals <b>used for training</b> all employees handling hazardous chemicals?	X	
<b>Stormwater</b>			
9a	Is a National Pollutant Discharge Elimination System (NPDES) Storm Water Permit required of this facility?		
9b	Does the marina have a NPDES Storm Water Permit?	X <sup>[e]</sup>	
10a	When pressure washing boats coated with ablative paints, are any efforts undertaken to prevent removed material from <b>releasing to water</b> ?	X	
	When pressure washing boats coated with ablative paints, are any efforts undertaken to prevent <b>contamination of land</b> ?	X	

10b	Are blasting, other paint preparation and painting activities contained or controlled to prevent abrasives, paint chips, and overspray from being released <b>to the water</b> ?	X	
	Are blasting, other paint preparation and painting activities contained or controlled to prevent abrasives, paint chips, and overspray from being released <b>to land</b> ?	X	
	Are blasting, other paint preparation and painting activities contained or controlled to prevent abrasives, paint chips, and overspray from being released <b>to protect employees</b> ?	X	
<b>Question #</b>	<b>Description</b>	<b>Regulatory Compliance Measure</b>	<b>Best Environmental Practice Indication</b>
10c	Are all engine fluids promptly transferred from parts, drip pans, used filters, and other containers to closed receptacles for disposal or recycling?	X	
10d	Are fuels, solvents, and paints stored in a protected secure location, away from drains?	X	
	Are fuels, solvents, and paints plainly labeled?	X	
11	Has the marina made structural changes to minimize surface water runoff?		X
	Has the marina implemented <b>berming</b> to minimize surface water runoff?		X
	Has the marina made changes to <b>vegetation</b> to minimize surface water runoff?		X
	Has the marina made changes to <b>riprap</b> to minimize surface water runoff?		X
	Has the marina made changes to <b>drains</b> to minimize surface water runoff?		X
	Has the marina used the <b>placement of filters</b> in drains to minimize surface water runoff?		X
	Has the marina made <b>other</b> structural changes to minimize surface water runoff? (fill in)		X
<b>Other Best Environmental Management Practices</b>			
12	Has the facility switched to alternative materials or products to reduce toxicity or other hazards to health, safety, or the environment?		X
	Has the facility switched <b>to safer paint stripping</b> to reduce toxicity or other hazards to health, safety, or the environment?		X
	Has the facility switched <b>to safer painting</b> to reduce toxicity or other hazards to health, safety, or the environment?		X

Has the facility switched to <b>safer MSD odor chemicals</b> to reduce toxicity or other hazards to health, safety, or the environment?		X
Does the facility use <b>dust collection</b> methods to reduce toxicity or other hazards to health, safety or the environment?		X
Has the facility switched to <b>phosphate free cleaners</b> to reduce toxicity or other hazards to health, safety, or the environment?		X
Has the facility switched to <b>biodegradable cleaners</b> to reduce toxicity or other hazards to health, safety, or the environment?		X
Has the facility switched to <b>safer anti-freeze</b> to reduce toxicity or other hazards to health, safety, or the environment?		X
Has the facility switched to <b>other</b> materials or products to reduce toxicity or other hazards to health, safety, or the environment? (fill in)		X



Question #	Description	Regulatory Compliance Measure	Best Environmental Practice Indication
13	Does the facility have a sewage pump out system?		X
	Does the facility have a sewage pump out system <b>onshore</b> ?		X
	Does the facility have a sewage pump out system <b>on-boat</b> ?		X
14	Has the marina taken any action to improve environmental performance not included above?		X

<sup>[a]</sup> This question was eliminated in the 2004 survey since the regulatory threshold for above ground storage tanks is 1,320 gallons.

<sup>[b]</sup> This item is a regulatory requirement if a facility's aggregate above ground storage is 1,320 gallons or more and/or a below ground storage tank has a capacity of 42,000 gallons or more.

<sup>[c]</sup> If oil is stored at a facility under the regulatory thresholds then implementation of these items is a best environmental practice.

<sup>[d]</sup> Having spill prevention in place for dispensing fuel is a regulatory requirement (part one of question 6A) and indicates that a facility has implemented at least one of the items described in the sub-questions of 6A. However, if a facility has implemented more than one of the items described, this is categorized as a best environmental practice.

<sup>[e]</sup> This indicator is a regulatory requirement if a NPDES permit is required.

<sup>[f]</sup> This indicator is a best environmental practice if a NPDES permit is not required.

---

# APPENDIX C: CUSTOMER SATISFACTION SURVEY QUESTIONNAIRE

---

EPA ICR 1711.04  
OMB Control Number 2090-0019  
Expiration Date: 08/31/09

## Customer Service Survey Questionnaire New England Marinas Initiative Environmental Protection Agency Region 1

**1. Since 2001, have you attended any workshops or training sessions on marina environmental issues that were either sponsored or co-sponsored by EPA?**

- Yes
- No.....[Go to Question 7]

**2. How did you learn about the workshop(s) or training session(s) that you attended?**

- EPA web site
- Mailings
- E-mail announcement
- Word of mouth
- Advertisement in trade publication (or other material)
- Other EPA-sponsored events/training
- Other (please specify) \_\_\_\_\_

**3. What would be your most satisfactory way to learn about workshops and/or training(s)?**

- EPA web site
- Mailings
- E-mail announcement
- Word of mouth
- Advertisement in trade publication (or other material)
- Other EPA-sponsored events/training
- Other (please specify) \_\_\_\_\_

**4. On a scale of 1 to 4 (with 1 being “Very Dissatisfied” and 4 being “Very Satisfied”), how satisfied were you with the content of the workshop(s) and/or training with respect to each of the following practices:**

	1	2	3	4	Did not cover/Do not recall
Spill prevention procedures or devices (e.g. overfill alarms)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of closed receptacles for disposal or recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clear labeling and secure storage of fluids (e.g. fuels and paints)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structural changes to minimize surface water runoff (e.g. berming, filters and riprap)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of alternative practices or materials to reduce toxicity or other hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation of a sewage pump-out system (onshore or on-boat)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. On the whole, how satisfied were you with the content of those workshops or training sessions?

- Very satisfied
- Somewhat satisfied
- Somewhat dissatisfied
- Very dissatisfied

6. Do you have any additional comments about your satisfaction with the workshops and/or training sessions (e.g. content, location, instructors)?

7. Over the last three years, have you ever visited the EPA New England Marinas web site to obtain information that would assist you in dealing with environmental issues at your marina?

- Yes, very often
- Yes, somewhat often
- Yes, but only rarely
- No.....[Go to Question 14]

8. How did you learn about the EPA New England Marinas web site?

- EPA web site
- Mailings
- E-mail announcement
- Word of mouth
- Advertisement in trade publication (or other material)
- Other EPA-sponsored events/training
- Other (please specify) \_\_\_\_\_

9. What would be your most satisfactory way to learn about EPA New England Marinas web site?

- EPA web site
- Mailings

- E-mail announcement
- Word of mouth
- Advertisement in trade publication (or other material)
- Other EPA-sponsored events/training
- Other (please specify) \_\_\_\_\_

10. How satisfied were you with the design of the site [i.e., how easy was it to locate the materials that you were looking for on the web site]?

- Very satisfied
- Somewhat satisfied
- Somewhat dissatisfied
- Very dissatisfied
- I was unable to locate the materials I was looking for..... [Go to Question 15]

11. On a scale of 1 to 4 (with 1 being “Very Dissatisfied” and 4 being “Very Satisfied”), how satisfied were you with content of the web site with respect to the following practices:

	1	2	3	4	Did not cover/Do not recall
Spill prevention procedures or devices (e.g. overfill alarms)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of closed receptacles for disposal or recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clear labeling and secure storage of fluids (e.g. fuels and paints)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structural changes to minimize surface water runoff (e.g. berming, filters and riprap)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of alternative practices or materials to reduce toxicity or other hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation of a sewage pump-out system (onshore or on-boat)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. On the whole, how satisfied were you with the content of the web site?

- Very satisfied
- Somewhat satisfied
- Somewhat dissatisfied
- Very dissatisfied

13. Do you have any additional comments about your satisfaction with the web site (e.g. content, technical complexity, additional resources, format)?

14. Since 2001, have you used any EPA or state guidance documents or fact sheets to assist with the marina's environmental compliance or suggestions about best environmental practices?

- Yes
- No.....[Go to Question 20]

15. How did you learn about the guidance documents or fact sheets?

- EPA web site
- Mailings
- E-mail announcement
- Word of mouth
- Advertisement in trade publication (or other material)
- Other EPA-sponsored events/training
- Other (please specify) \_\_\_\_\_

16. What would be your most satisfactory way to learn about guidance documents or fact sheets?

- EPA web site
- Mailings
- E-mail announcement
- Word of mouth
- Advertisement in trade publication (or other material)
- Other EPA-sponsored events/training
- Other (please specify) \_\_\_\_\_

17. On a scale of 1 to 4 (with 1 being "Very Dissatisfied" and 4 being "Very Satisfied") how satisfied were you with the content of the guidance materials with respect to the following practices:

	1	2	3	4	Did not cover/Do not recall
Spill prevention procedures or devices (e.g. overfill alarms)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of closed receptacles for disposal or recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clear labeling and secure storage of fluids (e.g. fuels and paints)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structural changes to minimize surface water runoff (e.g. berming, filters and riprap)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of alternative practices or materials to reduce toxicity or other hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation of a sewage pump-out system (onshore or on-boat)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. On the whole, how satisfied were you with the content of the guidance materials?

- Very satisfied
- Somewhat satisfied
- Somewhat dissatisfied
- Very dissatisfied

19. Do you have any additional comments about your satisfaction with the guidance materials (e.g. content, technical complexity, additional resources, format)?

**Finally, in order to understand which facilities are most satisfied with which products and services and to improve the products and services available to your facility, we have a few more questions.**

20. How many full- and part-time employees work at your facility?

\_\_\_\_\_ Full time employees

\_\_\_\_\_ Part time employees

21. How many boats are moored, docked, or stored on land at your facility?

\_\_\_\_\_ Boats Moored

\_\_\_\_\_ Boats Docked

\_\_\_\_\_ Boats stored on land

22. Are maintenance or repair operations performed at the facility?

- Yes, they are primarily do-it-yourself activities performed by boat owners
- Yes, but they are not primarily do-it-yourself activities performed by boat owners
- No

23. **How many years of experience do you have with the following environmental practices at your marina?**

	No Experience	Less than 3 years	Between 3 and 6 years	More than 6 years
Spill prevention procedures or devices (e.g. overfill alarms)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of closed receptacles for disposal or recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Clear labeling and secure storage of fluids (e.g. fuels and paints)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structural changes to minimize surface water runoff (e.g. berming, filters and riprap)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of alternative practices or materials to reduce toxicity or other hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installation of a sewage pump-out system (onshore or on-boat)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for your participation in the survey! If we may contact you to clarify your responses, please provide an e-mail address: \_\_\_\_\_

**Burden Statement: Public reporting burden for this collection of information is estimated to average 10 minutes per response, including the time for reviewing instructions, gathering information, and completing and reviewing the collection of information. Send comments on the Agency’s need for this information, the accuracy of the provided burden estimates, and any suggestions for reducing the burden, including the use of automated collection techniques to the Director, OEI Collections Strategies Division, United States Environmental Protection Agency, Mail Code 2822, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460-0001; and to the Office of Information and Regulatory Affairs, Office of Management & Budget, 725 17th Street NW, Washington, DC 20503. Attention: Desk Officer for EPA. Include the EPA ICR number (1711.05) and the OMB control number (2090-0019) in any correspondence.**

## APPENDIX D: PROPENSITY SCORE MATCHING ANALYSIS

Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis					Outcome Category [a]
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Entities in Treatment Group	Matched Controls	ATT	Standard Error	t statistic	
Are Manifests Documenting Hazardous Waste Shipments Kept, Going Back At Least 3 Years?	55	76.40%	56	75.00%	51	53	-0.047	0.091	-0.52	R
Do employees receive training in proper handling of wastes?	63	81.00%	65	73.80%	60	61	-0.154	0.081	-1.89	R
Do employees receive training in emergency procedures?	63	81.00%	60	81.70%	55	61	-0.064	0.076	-0.834	R
Are Quantities Of Hazardous Waste Generated By The Marina Calculated Each Month, To Determine What Size Generator The Marina Is?	63	15.90%	61	14.80%	57	61	-0.031	0.071	-0.428	R
Are All Hazardous Wastes Stored In Labeled Containers?	59	57.60%	59	59.30%	54	58	0.061	0.099	0.616	R
Are All Hazardous Wastes Stored In A Dedicated Storage Area?	60	81.70%	58	86.20%	53	56	0.081	0.076	1.06	R
Are All Hazardous Wastes Stored Indoors Or Covered?	60	71.70%	58	82.80%	53	56	0.126	0.084	1.494	R
Are All Hazardous Wastes Stored In An Area With An Impervious Floor?	60	66.70%	57	75.40%	52	56	0.118	0.093	1.276	R
Are All Hazardous Wastes Stored With Storage Area Spill Containment?	60	45.00%	55	58.20%	50	56	0.16	0.1	1.598	R
Are All Hazardous Wastes Shipped With A Properly Licensed Transporter?	49	83.70%	57	86.00%	53	48	-0.023	0.079	-0.291	R
Is Oil (Including Motor Fuel) Stored Above Ground In Any Single Tank With Over 660 Gallons Capacity?	57	26.30%	1	100.00%	1	13	0.692	-	-	-
Is Oil (Including Motor Fuel) Stored Above Ground In Total Aggregate Capacity Of Over 1,320 Gallons?	54	18.50%	58	25.90%	54	53	0.03	0.084	0.361	-
Is Oil (Including Motor Fuel) Stored Below Ground In Total Aggregate Capacity Of 42,000 Gallons?	54	100.00%	59	100.00%	54	53	0	0	-	-
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) On Site? [b]	10	20.00%	14	35.70%	8	9	0.192	0.247	0.778	R
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) On Site? [c]	36	2.80%	29	24.10%	22	33	0.267	0.103	2.578	BP
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Signed By A Registered Professional Engineer? [b]	9	11.10%	13	15.40%	8	9	0.083	0.206	0.404	R
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Signed By A Registered Professional Engineer? [c]	36	2.80%	17	5.90%	14	33	0.062	0.08	0.775	BP
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Posted In Plain View At Oil Storage Locations? [b]	10	0.00%	13	7.70%	8	10	0	0	-	R



Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis					Outcome Category [a]
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Entities in Treatment Group	Matched Controls	ATT	Standard Error	t statistic	
Is A Spill Prevention, Control And Countermeasure Plan (SPCC) Posted In Plain View At Oil Storage Locations? [c]	36	2.80%	16	12.50%	13	33	0.144	0.11	1.31	BP
Does Above Ground Oil Storage (Including Piping System) Have Secondary Containment? [b]	10	90.00%	15	86.70%	9	10	-0.111	0.184	-0.604	R
Does Above Ground Oil Storage (Including Piping System) Have Secondary Containment? [c]	10	50.00%	18	38.90%	12	9	-0.017	0.243	-0.069	BP
Does Above Ground Oil Storage (Including Piping System) Have Leak Detection? [b]	9	55.60%	13	61.50%	8	9	-0.038	0.268	-0.143	R
Does Above Ground Oil Storage (Including Piping System) Have Leak Detection? [c]	11	45.50%	19	36.80%	14	10	0.009	0.231	0.04	BP
Does Below Ground Oil Storage (Including Piping System) Have Secondary Containment? [b]	2	100.00%	3	100.00%	1	2	0	-	-	R
Does Below Ground Oil Storage (Including Piping System) Have Secondary Containment? [c]	28	96.40%	21	85.70%	19	27	-0.062	0.083	-0.747	BP
Does Below Ground Oil Storage (Including Piping System) Have Leak Detection? [b]	2	100.00%	3	100.00%	1	2	0	-	-	R
Does Below Ground Oil Storage (Including Piping System) Have Leak Detection? [c]	28	96.40%	22	90.90%	19	26	-0.037	0.084	-0.44	BP
Are Spill Prevention Procedures In Place For Receiving Oil From A Supplier?	41	75.93%	27	64.29%	38	54	-0.057	0.101	-0.567	R
Are Spill Prevention Procedures In Place For Transferring Oil Within The Facility?	27	48.21%	35	74.47%	43	56	0.251	0.100	2.507	R
Are Spill Prevention Procedures In Place For Waste Oil Disposal?	37	67.27%	40	75.47%	48	55	0.049	0.096	0.512	R
Does The Facility Have Spill Prevention Procedures In Place For Fuel Dispensing?	50	96.00%	43	83.70%	38	49	-0.151	0.071	-2.115	R
Does The Facility Have More than One Spill Prevention Procedure In Place For Fuel Dispensing?	42	87.50%	34	94.40%	31	47	0.094	0.073	1.290	BP
Is Containment In Place In Case Of A Spill?	52	86.50%	47	83.00%	42	51	-0.064	0.082	-0.779	R
How Would You Evaluate The Effectiveness Of The Methods You Are Using To Prevent Releases? [d]	53	2.8679	49	3.1837	45	52	0.288	0.128	2.241	BP
How Would You Evaluate The Effectiveness Of The Methods You Are Using To Prevent Releases? [d]	53	2.8679	49	3.1837	45	52	0.288	0.128	2.241	R
Has The Amount Of Each Hazardous Material Stored Onsite Been Calculated (Including Motor Fuel In Above-Ground Systems Greater Than 10,000 Lbs Capacity) To Determine If Reporting To The Local Emergency Planning Committee Is Necessary?	63	23.80%	51	25.50%	42	61	-0.015	0.094	-0.161	R

Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis					Outcome Category [a]
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Entities in Treatment Group	Matched Controls	ATT	Standard Error	t statistic	
Are Material Safety Data Sheets (MSDs) For All Hazardous Chemicals Kept On File?	63	63.50%	66	78.80%	61	61	0.106	0.087	1.223	R
Are Material Safety Data Sheets (MSDs) Used For Training All Employees Handling Hazardous Chemicals?	67	52.20%	49	73.50%	45	65	0.197	0.096	2.054	R
Is A National Pollutant Discharge Elimination System (NPDES) Storm Water Permit Required Of This Facility?	69	76.80%	61	85.20%	58	67	0.078	0.074	1.053	-
Does The Marina Have A NPDES Storm Water Permit? [e]	41	2.40%	48	35.40%	46	40	0.354	0.077	4.592	R
Does The Marina Have A NPDES Storm Water Permit? [f]	14	100.00%	8	100.00%	7	12	0	0	-	BP
When Pressure Washing Boats Coated With Ablative Paints, Is Removed Material Collected To Prevent Releases To Water?	61	59.02%	63	63.49%	58	59	-0.019	0.096	-0.193	R
When Pressure Washing Boats Coated With Ablative Paints, Is Removed Material Collected To Prevent Contamination Of Land?	61	55.74%	62	53.23%	58	59	-0.072	0.098	-0.737	R
Are Blasting, Other Paint Preparation And Painting Activities Contained Or Controlled To Prevent Abrasives, Paint Chips, And Overspray From Being Released To The Water?	51	82.35%	55	81.82%	51	49	-0.023	0.082	-0.280	R
Are Blasting, Other Paint Preparation And Painting Activities Contained Or Controlled To Prevent Abrasives, Paint Chips, And Overspray From Being Released To Land?	51	82.35%	57	73.68%	52	49	-0.114	0.087	-1.315	R
Are Blasting, Other Paint Preparation And Painting Activities Contained Or Controlled To Prevent Abrasives, Paint Chips, And Overspray From Being Released To Protect Employees?	52	90.40%	51	92.20%	46	50	0	0.062	0.006	R
Are All Engine Fluids Promptly Transferred From Parts, Drip Pans, Used Filters And Other Containers To Closed Receptacles For Disposal Or Recycling?	57	96.50%	61	90.20%	56	55	-0.065	0.05	-1.29	R
Are Fuels, Solvents And Paints Stored In A Protected, Secure Location, Away From Drains?	60	95.00%	65	80.00%	60	58	-0.125	0.06	-2.104	R
Are Fuels, Solvents And Paints Plainly Labeled?	60	91.70%	58	56.90%	54	58	-0.368	0.079	-4.632	R
Has The Marina Made Structural Changes To Minimize Surface Water Runoff?	65	69.20%	62	71.00%	58	63	0.047	0.087	0.532	BP
Has The Marina Made Structural Changes To Berming?	65	55.40%	60	40.00%	56	63	-0.167	0.096	-1.729	BP
Has The Marina Made Structural Changes To Vegetation?	64	51.60%	62	51.60%	58	62	-0.012	0.097	-0.126	BP
Has The Marina Made Structural Changes To Riprap?	64	21.90%	58	44.80%	54	62	0.212	0.09	2.367	BP
Has The Marina Made Structural Changes To Drains?	64	25.00%	55	29.10%	52	62	-0.017	0.088	-0.19	BP
Has The Marina Made Structural Changes To Placement Of Filters In Drains?	64	14.10%	50	42.00%	47	62	0.24	0.088	2.732	BP

Outcome	2001 Data		2004 Data		Propensity Score Matching Analysis					Outcome Category [a]
	Marinas With a Reported Outcome	Average Value for Outcome	Marinas With a Reported Outcome	Average Value for Outcome	Entities in Treatment Group	Matched Controls	ATT	Standard Error	t statistic	
Has The Facility Switched To Alternative Materials Or Products To Reduce Toxicity Or Other Hazards To Health, Safety, Or The Environment?	66	89.40%	57	87.70%	53	64	-0.017	0.063	-0.274	BP
Has The Facility Switched To Safer Paint Stripping?	41	46.30%	40	52.50%	39	39	0.071	0.119	0.594	BP
Has The Facility Switched To Safer Painting?	52	73.10%	51	62.70%	48	50	-0.116	0.098	-1.188	BP
Has The Facility Switched To Safer MSD Odor Chemicals?	57	26.30%	44	31.80%	42	55	0.034	0.095	0.356	BP
Has The Facility Switched To Dust Collection?	50	66.00%	51	78.40%	48	48	0.141	0.095	1.479	BP
Has The Facility Switched To Phosphate-Free Cleaners?	53	37.70%	52	48.10%	50	51	0.098	0.103	0.956	BP
Has The Facility Switched To Biodegradable Cleaners?	62	88.70%	55	72.70%	51	60	-0.174	0.077	-2.244	BP
Has The Facility Switched To Safer Antifreeze?	60	95.00%	53	96.20%	50	58	0.005	0.043	0.124	BP
Does The Facility Have A Sewage Pumpout System?	65	69.20%	69	62.30%	64	63	-0.039	0.089	-0.439	BP

[a] Outcomes are classified as either “regulatory compliance” (R) or “best environmental practice” (BP).

[b] This outcome is a regulatory requirement if a facility’s aggregate above ground storage is 1,320 gallons or more and/or a below ground storage tank has a capacity of 42,000 gallons or more; this row includes only those facilities for which this outcome is a regulatory requirement

[c] If oil is stored in a smaller storage tank than the regulatory thresholds, then implementation of these outcomes is a best environmental practice; this row includes only those facilities for which this outcome is a best environmental practice.

[d] This outcome was based on a four-point scale (where 4 was “Excellent” and 1 was “Poor”), as opposed to the rest of the outcomes in the table that all had Yes/No responses. Thus, the “Average Value For Outcome” columns (for both the 2001 and 2004 data) for this outcome contain the actual average rating for the group (as opposed to the percentage of “Yes” answers that is indicated for the other questions).

[e] This outcome is a regulatory requirement if a NPDES permit is required; this row includes only those facilities for which this outcome is a regulatory requirement.

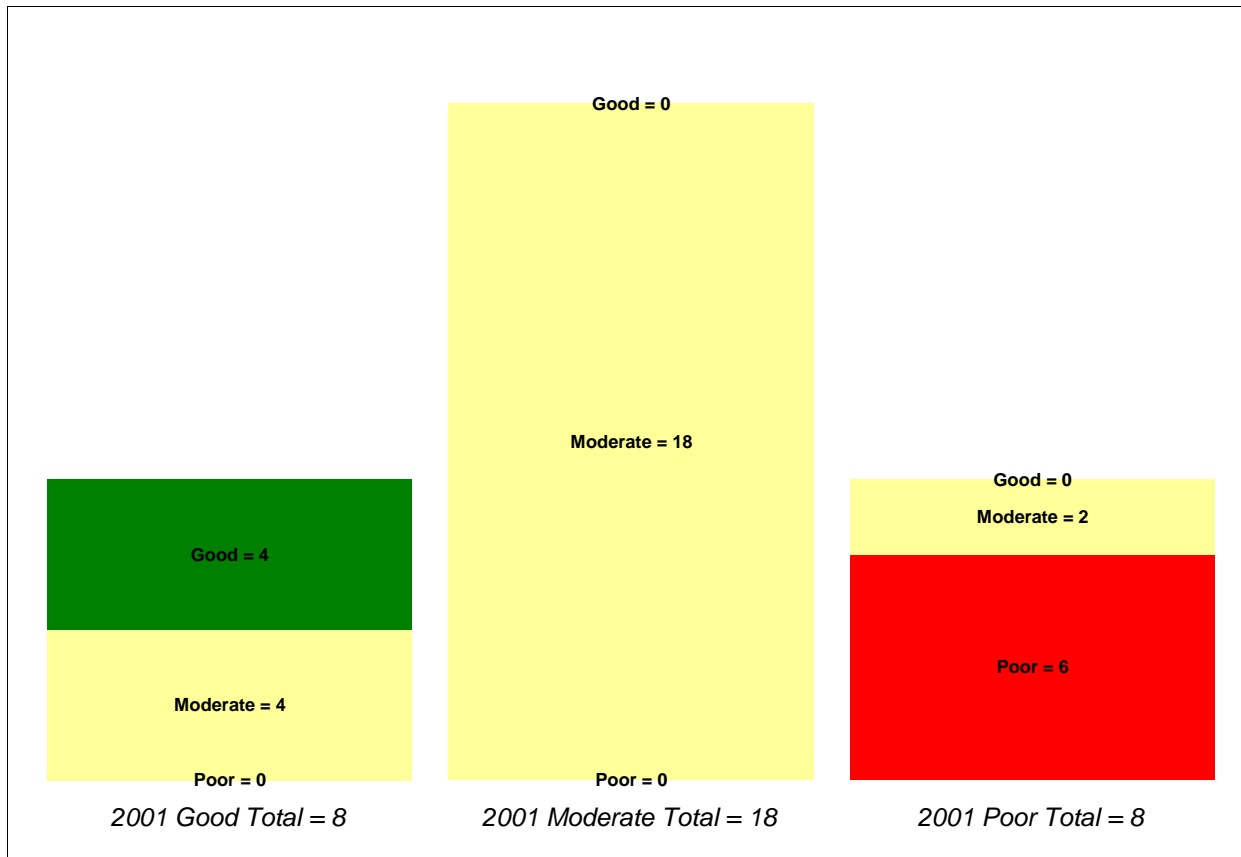
[f] This outcome is a best environmental practice if a NPDES permit is not required; this row includes only those facilities for which this outcome is a best environmental practice.

## APPENDIX – additional figures

Figure D-1 provides a graphical representation of the indicator outcomes for regulatory compliance highlighting changes between 2001 and 2004. In the figure, there are three qualitative categories for the indicators based on the percentage of facilities that attained each:

- Green (good): More than 90 percent of facilities attained the outcome,
- Yellow (moderate): Between 50 and 90 percent of facilities attained the outcome, and
- Red (poor): Less than 50 percent of facilities attained the outcome.

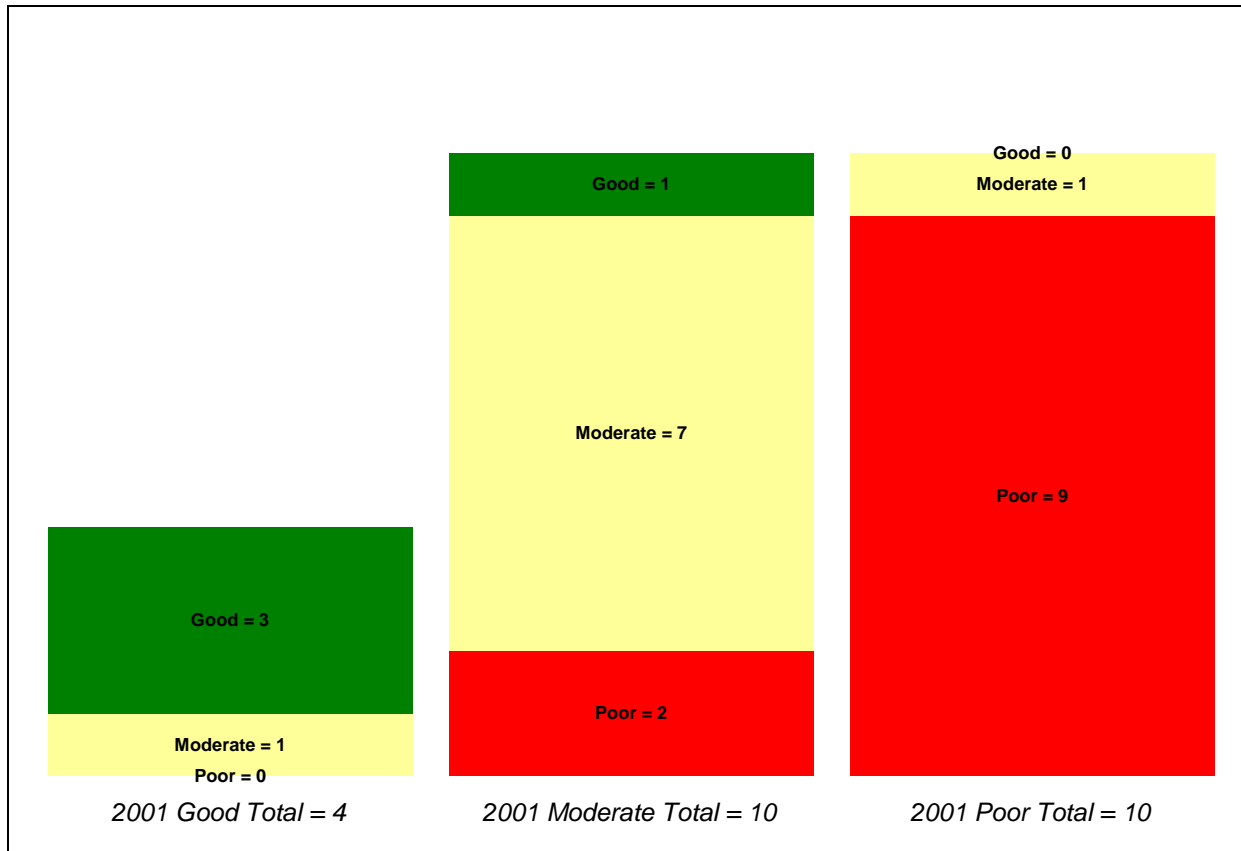
Indicators are grouped first by their 2001 values and then show how the 2004 values were distributed. For example, in Figure D-1, we see that there were eight indicators in the Good category in 2001.



**Figure D-1. 2004 Regulatory Compliance Indicators Assessed Qualitatively (Good, Moderate, and Poor) Grouped By 2001 Qualitative Assessments**

Figure D-2 provides a graphical representation of the indicator outcomes for best practices highlighting changes between 2001 and 2004. As with the regulatory compliance outcomes, we have created three qualitative categories for the indicators based on the percentage of facilities that attained each: Good (more than 90 percent of facilities attained the outcome), Moderate (between 50 and 90 percent of facilities attained the outcome), and Poor (less than 50 percent

of facilities attained the outcome). Indicators are first grouped by their 2001 values to show changes from 2001 to 2004. Among the BEP data, we see only one of four indicators deteriorate from Good to Moderate. Among the 2001 categorized as Moderate, we see one improvement to Good, but two deteriorations to Poor. Finally, among the Poor values in 2001, we see one improvement to Moderate.



**Figure D-2. 2004 Best Management Practice Indicators Assessed Qualitatively (Good, Moderate, and Poor) Grouped By 2001 Qualitative Assessment**

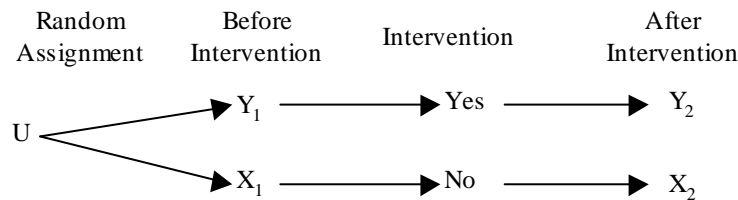
---

## APPENDIX E: PROPENSITY SCORE MATCHING

---

### METHOD DESCRIPTION

Propensity Score Matching (PSM) is a method that allows for comparison of outcomes between treatment and control groups in cases where a randomized control trial (RCT) has not been used. An alternative approach to making these comparisons would have been to use standard statistical hypothesis testing to test the differences between two mean values. PSM represents a more rigorous approach to looking for program impacts since it involves comparing matched units over time, thus mimicking a RCT. In fact, PSM is based on the premise that the best method of determining the impact of a program is to use an RCT. RCTs, however, are not feasible in non-experimental situations. In a RCT, a population (or sample from a population) is randomly divided into two groups: an experimental group and a control group. An intervention (or treatment) is applied to the experimental group, but not to the control group. The impact of the treatment is estimated by comparing outcomes for the experimental and control groups. The following diagram reflects the basic measurement model employed in a RCT:



The diagram depicts the two groups with the experimental group being denoted as Y and the control group as X. Units are randomly assigned to each group from a larger group (U). The intervention/treatment is applied to the experimental group while the control group receives no intervention/treatment. Each group is observed before the intervention (subscript equals 1) and after the intervention (subscript equals 2) and the value of some outcome is recorded at each observation point. Letting  $Y_i$  and  $X_i$  ( $i = 1, 2$ ) be the measured values for the outcomes, then the impact of the intervention can be measured as

$$(Y_2 - Y_1) - (X_2 - X_1)$$

A number of standard statistical tests can then be conducted to determine if the impact of the intervention, as measured above, is significantly different than zero.

In a non-experimental setting, some of these conditions break down. One common issue is that the population in non-experimental settings is not randomly divided between experimental and control groups. This is not an issue for the New England Marina Initiative, however, since the 2001 and 2004 site visits were randomly selected from the population of marinas and the marinas chosen for the customer satisfaction survey also will be randomly selected.

A second issue is that we may not observe both pre- and post-intervention outcomes for the experimental group. This is an issue for the New England Marina Initiative: we have post-intervention outcome data the marinas visited in 2004, but no data on these groups prior to the intervention. Additionally, we have data for a control group, i.e., marinas visited in 2001, but no follow-up data for that group. From the diagram above, we have the values  $Y_2$  and  $X_1$ , but not the values  $Y_1$  or  $X_2$ .

One approach to deal with the missing outcome data is to focus on averages for each group rather than on individual unit outcome measurements. Focusing on averages, however, has two important shortcomings. First, it ignores the fact that we are missing data values for  $Y_1$  or  $X_2$ .<sup>14</sup> The fact that the groups are all randomly selected reduces the impact of this problem to some degree. However, because the measurements are taken three or more years apart, comparing averages does not provide an ideal way of estimating an impact. For example, there might have been changes between 2001 and 2004 in the way marinas operate that are unrelated to the program (intervention). If this is the case, then the value  $(X_2 - X_1)$  will control for those changes. That is, the value  $(X_2 - X_1)$  represents the change between 2001 and 2004 in untreated units. Using average values ignore the value  $(X_2 - X_1)$ .

To overcome the issue with using averages, we can use matching techniques. Matching involves pairing treated and untreated units and then calculating the difference in outcomes between the matched pairs. This approach has a long history in evaluation research. The simplest matching approach is to choose some fixed factors and then match treated and untreated units based on those factors. For example, for the marinas, we could divide them into “small” and “large” marinas and divide them based on state. We could then compare small marinas in each state with one another and large in each state with one another. This still relies on averages, however, since we are still grouping the units. A more complex approach would rely on matching treated units to untreated units based on a statistical comparison on how well the units match to one another.

One issue, however, has to do with self-selection. That is, if the matching factors are correlated with treatments, then the estimated impacts of treatment from matched pairs will be biased. In an important paper in matching, Rosenbaum and Rubin (1983) identified conditions under which the bias can be controlled. Specifically, it is necessary to match units based on a single (composite) “score” that accounts for the matching factors and is also independent of treatment decisions.<sup>15</sup> They also showed that a good score is one that reflects the probability of treatment given an observed set of factors (e.g., the matching factors). Such a score is often referred to as the “propensity score” and can be estimated using standard statistical techniques such a logistic regression analysis. Propensity score values can be estimated for both treated and untreated units and the two groups can be matched based on values of the propensity scores. In applying PSM, there are a number of choices that need to be made (Caliendo and Kopeinig, 2005). We discuss some of those choices in the implementation section below.

There are some important things to understand about PSM, however. First, in PSM, there is no requirement that a single treated unit be matched to a single untreated unit. In fact, in many cases it is more efficient (in a statistical sense, which means a lower variance) to match one treated unit to more than one untreated unit. Second, there is no requirement to match all treated units to at least one untreated unit. There may be some treated units that do not have a good match. Third, one untreated unit can be matched to more than one treated unit. That is, an untreated unit may be a good match for more than one treated unit. Finally, there must be some overlap in the observed factors used for estimating the propensity score. For example, if all of the treated units are “large” and all of the untreated are “small,” then there is no overlap on size.

### Method Implementation

In applying PSM to this evaluation, we will be estimating the impact of the program as a whole. That is, we will be comparing the changes in outcomes between a baseline period (i.e., 2001) and a follow-up period (i.e., 2004). The data available to us do not allow for comparing the impact of the various program components. The outcomes will reflect both (self-reported) regulatory compliance and (self-reported) use of best environmental

---

<sup>14</sup> In fact, the implicit assumption is that the average for  $X_1$  will approximate the averages for both  $Y_1$  and  $X_2$ .

<sup>15</sup> The use of a composite score values overcomes what is known as the “curse of dimensionality” issue. For example, if the matching factors consist of  $n$  dichotomous variables, then there are  $2^n$  dimensions that need to be accounted for in the matching. For continuous variables, the number of dimensions is more complex. The composite score reduces that number of dimensions to one: the values of the composite variable.



practices.<sup>16</sup> We will look at changes between 2001 and 2004. In all cases, the “treatment group” will be marinas visited in 2004 during the site visits and the “control group” will be marinas visited in 2001.

Implementing PSM for each analysis will require three main steps:

- *Step 1—Estimate the propensity scores.* In this first step, the analyst will estimate a logistic regression model setting the dependent variable equal to one for members of the treatment group and zero for members of the control group. The covariates in the logistic regression will be a set of fixed factors such as marina size (e.g., number of boats docked) and location (state). Based on the resulting logistic regression model, we will estimate propensity scores for each marina in the control and treatment groups.<sup>17</sup>
- *Step 2—Match treatment group members with control group members using a matching algorithm.* In order to match treatment with control group members, the analyst will use the caliper matching method. This method involves defining an acceptable interval in the propensity score (e.g., 0.01 percentage points) and then matching each treatment group member to any control group member that has a propensity score within the defined interval around the treatment group member’s score. For example, if a treatment group member has a propensity score of 20 percent and we are using a caliper of 0.1 percentage points, then any marina with a propensity score between 19.9 percent and 20.1 percent is considered a match to the treatment group marina. This approach to matching incorporates two other decisions:
  - Allowing each treatment group member to be matched to more than one control group member.
  - Allowing each control group member to be used as a control for more than one treatment group member.
- *Step 3—Calculate the “treatment” effect.* In the final step, the analyst will calculate the impact of the treatment. For the most part, this will be done by calculating the difference in the mean values between the treatment and control groups and determining whether that difference is statistically significant using the proper standard errors that take into account the matching used.

---

<sup>16</sup> The set of regulatory compliance and best environmental practices outcomes can be found in Table B-1 of Appendix B.

<sup>17</sup> The propensity score for any marina is the probability of that marina being in the treatment group calculated using the estimated logistic regression model and the marinas values for the covariates included in the model.